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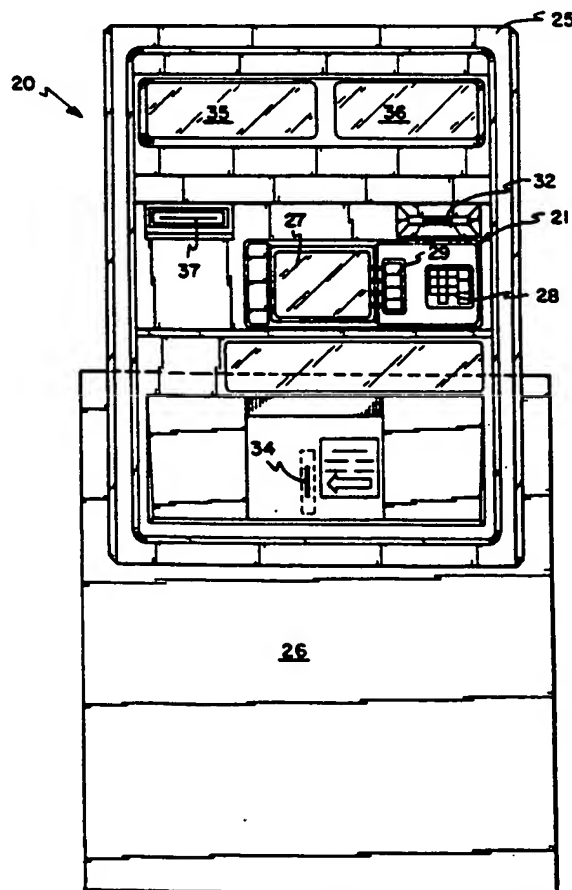
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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/US92/02316 <b>(22) International Filing Date:</b> 23 March 1992 (23.03.92)  <b>(30) Priority data:</b> 675,485                      26 March 1991 (26.03.91)                      US  <b>(71) Applicant:</b> DATACARD CORPORATION [US/US]; 11111 West Bren Road, Minnetonka, MN 55343 (US).  <b>(72) Inventors:</b> RUST, Jeffrey, J. ; 7933 Girard Court, Brooklyn Park, MN 55444 (US). BEECH, Brian, A. ; 7417 West 104th Street, Bloomington, MN 55438 (US).  <b>(74) Agent:</b> SCHUMANN, Michael, D.; Merchant, Gould, Smith, Edell, Welter & Schmidt, 3100 Norwest Center, 90 South Seventh Street, Minneapolis, MN 55402 (US).		<b>(81) Designated States:</b> AT (European patent), BE (European patent), CH (European patent), DE (European patent), DK (European patent), ES (European patent), FR (European patent), GB (European patent), GR (European patent), IT (European patent), JP, LU (European patent), MC (European patent), NL (European patent), SE (European patent).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** REMOTE CREDIT CARD ISSUANCE APPARATUS AND METHOD**(57) Abstract**

A personalized card issuer apparatus (20) for issuing personalized cards (39) while unattended. The apparatus (20) includes a user interface panel (21) for enabling a user to interface with the apparatus (20), a system controller (22) for controlling operation of the apparatus (20), and a card personalization mechanism (24) for personalizing cards (39) with personalized information under control of the system controller (22).



and/or cash card, the ATM machine is incapable of providing the user with a substitute personalized card.

In addition, there are various machines for issuing cards. For example, at subway stations there  
5 are machines for issuing cards bearing a determined monetary value depending upon the amount of money the user deposits in the card issuer machine. However, these cards are not personalized.

In addition there are small, table top sized  
10 embosser and encoder machines, e.g., the DataCard Series 210 which is used for creating personalized cards. However, the Series 210 is not an unattended, remote card issuer apparatus used by the end user, card holder.

It will thus be appreciated that while there  
15 are numerous ATM machines and other card issuance machines, none of these machines are capable of providing a remote, unattended card issuer apparatus for issuing personalized cards bearing user specific information.

20

### Summary of the Invention

The present invention relates to an unattended card issuer apparatus for automatically issuing personalized cards.

25 The present invention further relates to a method of issuing personalized cards at an unattended location wherein the cards are personalized at the location without requiring intervention by an operator.

In one embodiment, the card issuer apparatus  
30 comprises user interface means for entry of user information including user identification and for requesting issuance of a card personalized so as to contain user specific information. The card issuer apparatus further includes system controller means for  
35 receiving the user information including user identification, the system controller means being in communication with a remote host computer system for

transmitting user information therebetween. The card issuer apparatus further includes card personalization means for personalizing a card with user specific information including user identification under control  
5 of the system controller means.

In one embodiment of the invention, the card issuer apparatus includes an embosser for embossing information on a surface of the card and a magnetic encoder for magnetically encoding information on a  
10 magnetic strip of the card.

In an embodiment of the present invention, the card personalization means includes multiple input hopper means having a plurality of card containers whereby a plurality of different cards can be  
15 personalized. Thus, for example, cards from different banks and/or different cards from the same bank can be contained in the card issuer apparatus. Accordingly, in one application a user might request both a Visa card and a MasterCard® and/or two Visa® cards from different  
20 banks.

In the preferred embodiment of the present invention the card personalization means includes input hopper means comprising at least one removable, secured card container for preventing direct access to the  
25 container by an unauthorized person. Thus, during transit from a host site to the remote card issuer apparatus, the card container can be secured.

In one embodiment of the present invention, the card issuer apparatus is provided with storage means for  
30 storing cards rejected during the personalization process. Thus, cards which are not properly encoded and/or embossed can be rejected and stored without being issued to the user.

In one embodiment of the invention, a card  
35 presenting means is provided for presenting the personalized card to the user for removal from the card issuer apparatus. If the user does not remove the card

within a predetermined period of time, the personalized card is withdrawn back into the card issuer apparatus and stored.

In a preferred embodiment of the present invention, the card is contained within a secured enclosure such as a safe during the entire personalization process until the card is presented to the user for removal.

These and various other advantages and features of novelty which characterize the present invention are pointed out with particularity in the claims annexed hereto and forming a part hereof. However, for a better understanding of the invention, its advantages, and the objects obtained by its use, reference should be made to the accompanying drawings and descriptive matter, which form a further part hereof, and in which there is illustrated and described a preferred embodiment of the invention.

#### Brief Description of the Drawings

In the drawings, wherein like reference numerals generally indicate corresponding parts throughout,

Figure 1 is a diagrammatic front end view of an embodiment of a card issuer apparatus in accordance with the principles of the present invention;

Figure 2 is a block diagram illustrating the three major components of the embodiment shown in Figure 1;

Figure 3 is a block diagram illustrating the interconnection of the system controller to various elements of the embodiment shown in Figure 1;

Figure 4 is a partial perspective view of the card personalization system which is contained within a secured area of the embodiment of the card issuer apparatus shown in Figure 1;

Figure 5 is a block diagram illustrating interconnection of the card personalization controller to various elements of the embodiment shown in Figure 1;

Figures 6 thru 9 are diagrammatic, top planar views illustrating operation of an embodiment of a picker mechanism in accordance with the principles of the present invention;

Figure 10 is an enlarged perspective view of an embodiment of a magnetic stripe encoding apparatus;

Figure 11 is an end view of a card encoding transport mechanism in a non-transport opened position;

Figure 12 is an end illustration of the card encoding transport in the card transport position;

Figure 13 is a partial perspective view of an embodiment of an embosser and a card transport carriage arrangement;

Figure 14 is an enlarged end view illustrating displacement of a portion of the assembly to enable vertical movement of the card transport carriage;

Figure 15 is a partial enlarged top view of a rejected card storage apparatus which stores rejected cards;

Figure 16 is a block diagram of an embodiment of the card issuance process;

Figure 17 is an electrical schematic diagram of the system controller and its interconnection various elements of the card issuer apparatus;

Figures 18 and 19A,B are electrical schematic diagrams of the card personalization controller and its interconnection to the various elements of the card personalization mechanism;

Figure 20 is a perspective of an embodiment of a card container in accordance with the principles of the present invention;

Figure 21 is a partial, sectional view of the embodiment shown in Figure 20; and

Figures 22 thru 24 are planar diagrammatic views illustrated unlocking of the cover and door of the container.

5                    Detailed Description of a Preferred  
                    Embodiment of the Invention

                    Illustrated in Figure 1 is a front end, elevational view of an embodiment of a card issuer apparatus generally in accordance with the principles of  
10 the present invention, the card issuer apparatus being generally referred to by reference numeral 20. As diagrammatically illustrated in Figure 2, the card issuer apparatus 20 includes three basic functional components: a user interface panel 21 for enabling the  
15 user to interface with the card issuer apparatus 20, a system controller 22 for controlling operation of the card issuer apparatus 20 (see Figure 3) and a card personalization mechanism 24 (see Figure 4) for creating the personalized cards and presenting them to the user.  
20 As illustrated in Figure 1, the card issuer apparatus 20 includes a housing 25 disposed on top of a secured area such as a safe 26. In the preferred embodiment, the card personalization mechanism 24 is entirely contained within the area of the safe 26 so the card  
25 personalization mechanism 24 and the cards are secured from unauthorized tampering.

                    The user interface panel 21 in the embodiment shown includes a display 27 such as a cathode ray tube (CRT) for displaying information to the user. In  
30 addition, a keypad 28 and a soft key panel 29 are provided for user input of information. A card insertion slot 32 is provided for insertion of cards which are read by a magnetic stripe reader 46 or by any other suitable reader device such as an integrated  
35 circuit card reader, optical scanner, etc. Commercially available magnetic strip readers can be used. One embodiment of a magnetic strip reader is shown in Serial No. 312,738, filed February 17, 1989 and which is hereby

incorporated by reference. The card insertion slot 32 might be used by the user when the user already has a personalized card and is requesting additional cards, replacement cards, etc. In the preferred embodiment, the card issuer apparatus will also include a storage area adjacent the magnetic stripe reader for storing cards which are turned in by the user through the card insertion slot such as when a user is returning a card, etc. The card issuer apparatus 20 is able to read the user's card so as to obtain the necessary user specific information for card issuance purposes. In addition, a card presenting slot 34 is provided for presenting the newly personalized card to the end user. In the preferred embodiment, if the user does not remove the newly personalized card within a predetermined time, the card issuer apparatus 20 will withdraw the card back into the secured area 26 of the card issuer apparatus. In some embodiments, a camera 35 is present. The camera 35 might serve as a security camera and/or as a camera for creating a personalized card with an image of the user thereon. In addition, the user interface panel includes a light panel 36 for providing proper illumination of the user interface panel 21. Finally, a transaction receipt issuance slot 37 is present for issuing the user a transaction receipt documenting the transaction. The receipt is generated by a transaction receipt printer 33 (shown in Figure 3). Commercially available printers, such as an Epson dot matrix printer, can be used.

Referring now to Figure 4, the card personalization mechanism 24 contained within the secured area 26 is illustrated. The card personalization mechanism includes a card transport mechanism 214 which has a card transport carriage 38 for transporting a card 39 both horizontally and vertically within the secured area 26 generally along a card transport path. A multiple input hopper 44 having

multiple card containers 45 is provided in the preferred embodiment so as to enable different card issuer cards and/or cards to be input and personalized by the card issuer apparatus 20. A picker mechanism 43 capable of  
5 vertical and horizontal movement is provided for removing a card from the selected container 45. An embosser mechanism 48 is present for embossing the card with personalized information. In addition, in the preferred embodiment, a magnetic encoder 50 is present  
10 for magnetically encoding a magnetic strip on the card with personalized information. If during the personalizing process, it is determined that a card for whatever reason is not properly personalized, the cards are rejected and stored in a rejected card storage  
15 apparatus 56.

Illustrated in Figure 3 is a block diagram of the system controller and the various peripherals with which it communicates. The system controller 22 might be a microprocessor such as an Intel 386sx microprocessor  
20 with appropriate supporting memory. As illustrated, the system controller includes a modem 68 for communication with a remote host computer 64 by telephone lines 66. It will be appreciated that communications with the remote host computer 64 might be implemented by various  
25 methods; e.g., by use of wireless transmissions. Indeed the host computer might be directly cabled to the card issuer apparatus 20. The card issuer apparatus 20 and the system controller 22 preferably utilize an alternating current source of power 60; i.e. 220 volt  
30 A.C. In addition, in the preferred embodiment, a back up power supply 58 or an uninterruptible power supply (UPS) is provided so that in the event there is a power failure, power is provided for a sufficient period of time so as to enable the user to retrieve his/her card  
35 from the card insertion slot 32. In yet other embodiments of the present invention power might be provided long enough to allow the completion of the

personalization process and issuance of the card to the user. In a preferred embodiment, the system controller 22 will have at its disposal various diagnostics 70 for enabling testing of the card issuer device 20 both  
5 remotely by the host computer 64 and at the remote site by a maintenance person.

The system controller 22 is illustrated as being interconnected to a card personalization controller 30 which in turn is interconnected to various  
10 elements of the card personalization mechanism 24, see Figure 5, such as system sensors 62, rollers 63, stepper motors 80, and solenoids 160 which are located throughout the card personalization mechanism 24. Once the system controller 22 verifies the user request for a  
15 personalized card(s), the system controller 22 will instruct the card personalization controller 30 to proceed with the card personalization process. The card personalization controller 30 will utilize the various system sensors 62 to detect and monitor the location of  
20 the card throughout the issuance process. The rollers 63, stepper motors 80, and solenoids 160 will be utilized to facilitate movement of the card and perform the card personalization.

Many of the individual components of the remote  
25 card issuer device are individually disclosed in Applicant's prior pending applications and issued patents. The following U.S. Letters Patent and pending applications are hereby incorporated by reference:

	<u>Patent/S rial</u> <u>Number</u>	<u>Issue/Filing Date</u>	<u>Title</u>
5	S.N. 312,738	February 17, 1989	Magnetic Encoding Device for Cards
	S.N. 276,236	November 23, 1988	Output Hopper Apparatus
10	S.N. 276,235	November 23, 1988	Method and Apparatus for Driving and Controlling an Improved Solenoid Impact Imprinter
15	S.N. 464,569	January 16, 1990	Card Embossing Apparatus and Method
20	S.N. 276,233	November 23, 1988	Transport System and Method for Embossing Apparatus
	4,937,438	June 26, 1990	Magnetic Encoding Apparatus and Method
25	4,921,237	May 1, 1990	Input Hopper Apparatus and Method

Operation of the remote card issuer apparatus  
 30 20 will not be described. The operation will be described in terms of a user obtaining a credit card at the card issuer apparatus 20. However, as previously discussed, the present invention has numerous other applications.

35 The user will enter his/her identification code and select the type of transaction desired from the soft key panel 29. As the information input by the user is received by the system controller 22, the system controller 22 will relay the information by modem 68 to.  
 40 the host computer 64. After all the necessary information has been received, the host computer 64 will then instruct the system controller 22 by modem to either start the card personalization process or to void the entire transaction depending on whether proper  
 45 verification is established by th host computer 64. In some transactions and embodiments of the present

invention, it may not be necessary to communicate with the host computer 64 at the time of the transaction as the necessary information may have previously been downloaded to memory of the card issuer apparatus 20.

5 Accordingly, in these embodiments, the card issuer apparatus 20 will perform its own verification.

Once the requested transaction is verified, the card personalization process is now started by the system controller 22 signalling the card personalization controller 30 to proceed with card personalization. The first step in the personalization process is to pick a card from one of the card containers 45. Figures 6-8 illustrate operation of a card picker mechanism 43 picking a card from one of the containers 45. A drive stepper motor 80a controlling movement of the vertically positionable picker mechanism 43 which is slidably positioned on supports 42, is activated to position the picker mechanism 43 vertically up or down to the desired card container 45 so as to achieve vertical alignment with the container 45. Sensor 62a is used by the system controller 22 as a reference point to calibrate the vertical location of the picker mechanism 43. Once properly vertically positioned, a stepper motor 80b will be activated to move the picker mechanism 43 horizontally toward the open end of the desired card container 45 to a position as generally illustrated in Figure 7. The card personalization controller 30 will then signal the picker mechanism 43 to start the card-pick cycle and pick a card from the desired container 45.

The picker mechanism and pick cycle of the embodiment shown is similar to that previously described and illustrated in U.S. Letters Patent No. 4,921,237 which issued May 1, 1990. It will be appreciated that other picker mechanisms might be used. The card containers 45 are preferably similar to those used for cash in ATM machines will be discussed herein.

Referring now to Figures 7 and 8, as the pick cycle begins, a drive arm 101 is driven by a stepper 80c, driving a passive suction cup 104 forward toward the front of the system. In one embodiment of the invention the suction cup 104 will travel at a variable speed along its path of travel. Pivotaly mounted card pinch members 106, disposed proximate the end of the card container 45, are driven in toward the leading and trailing sides of the stack of cards 39 by pinch activation members 105. The card pinch members 106 engage the sides of the cards and slightly bow the first few cards in the direction toward the pick arrangement, with most of the force being placed on the first card.

After the cards are pinched so as to be somewhat fanned apart, the suction cup 104 forces the first few cards of the stack of the cards from the rear bowed condition through a relatively straight or aligned position to a forward bowed condition. As the cards are forced apart into the forward bowed condition, the bending moment of the second, third, etc. cards cause them to separate from the first card at the sides. At the end of the fanning process, the suction cup 104 is moved completely forward, and the air in the suction cup 104 is forced out through a one-way valve. This creates a partial vacuum between the suction cup 104 and the back surface of the card 39 in contact with the suction cup 104 when a backward force is exerted on the suction cup 104, whereby the suction cup adheres to the back surface of the card.

In the preferred embodiment of the invention the suction cup assembly forms its vacuum without the assistance of pumps or other vacuum assist devices. Further, in the embodiment shown, the card container 45 uses a spring mass arrangement with a card pusher assembly 110 to insure that the force required to move the stack of cards 39 in the forward direction is

greater than the force required to collapse the suction cup, thereby assuring formation of a partial vacuum.

After the cards have been fanned, the picker mechanism 43 begins moving backward, pulling the first  
5 card away from the remaining stack of cards to a rear bowed position. A combination of static charge, vacuum between the cards, friction, and inertia provides a force-resisting movement of the stack of cards backwards so as to prevent the remaining cards from following the  
10 first card. It will be appreciated that the resistive force and biasing force might be provided in any number of ways.

The pinch activation members 105 disengage from the card pinch members 106 so as to release the stack of  
15 cards and allow the stack of cards to slide backward into position so as to be ready for the next pick cycle. The card pusher assembly 110 moves the cards slower toward the back end of the hopper receptacle than the suction cup moves backward, thereby assuring the card is  
20 separated from the stack of cards.

The card is pulled backward by the suction cup 104 until the leading side is bowed beyond the nip defined by driven rollers 63a and 63b, the roller 63a and structure 108 restricting movement of the card in a  
25 backward direction. At this time the rollers 63a-d are not being driven so as to be rotating. In the preferred embodiment, the suction cup 104 is offset so as to be closer to the leading side of the card than to the trailing side of the card.

30 As the picker mechanism 43 approaches its maximum rear position, a suction release valve is depressed enabling air flow from the outside ambient air into the area between the suction cup 104 and the card so as to remove the vacuum therebetween and release the  
35 card. When released, the bowed card 39 straightens out and forces its leading edge into the nip of the rollers 63a,b as generally illustrated in Figure 9. The card 39

is now ready to be transferred away from the input  
hopper 44. Optical sensor 62b senses that a card has  
been picked and sends an appropriate signal to the card  
personalization controller 30. The picker mechanism is  
5 now moved horizontally away from the container 45. Then  
the picker mechanism is vertically positioned so as to  
be vertically and horizontally aligned with the input of  
the encoder 50. The card personalization controller 30  
then drives the rollers 63a,d so as to move the card 39  
10 to a card transfer position on the card transfer path.  
The card is made to move by opposite cooperating  
rotation of each of the roller pairs 63a,b and 63c,d.

As the rollers begin turning, the card begins  
moving toward the transfer position. A guide structure  
15 is preferably present to guide movement of the card  
between the rollers 63a-d. In the embodiment shown, a  
plate 118 and a plate 120 serve this function. When the  
trailing edge of the card is detected by sensor 62c,  
sensor 62c sends the appropriate signal to the card  
20 personalization controller 30. The card personalization  
controller 30 then stops driving the rollers 63a-d such  
that the transfer cycle from the picker mechanism to the  
encoder is then completed.

Upon completion of the card transfer cycle from  
25 the picker mechanism, the encoding cycle will begin.  
While various commercial encoders might be utilized, the  
embodiment of the present invention shown uses the  
encoder generally described in U.S. Letters Patent No.  
4,937,438, issued June 26, 1990.

30 As shown in Figures 10 thru 12, the encoder 50  
comprises a slotted top rail 122 and a slotted bottom  
rail 124 defining a card transport path for receiving  
top and bottom edges of the card 39. Once the card is  
at the encoder, an encoder card carriage 130 rotates  
35 into the card transport path for advancing the card  
along the path past the read/write head. A read/write  
head 132 mounts on a bracket 134 which allows the head

torsional movement for twisting and movement toward and away from the card but resists deflection in all other directions. On the first pass, the read/write head reads preencoded information from the card to verify card type. If the card is verified, the encoding process will continue. If not verified, the card is rejected and the system controller 22 is informed of the card's rejected status. Once verified, the encoder card carriage moves the card back past the read/write head. The card is then moved forward by the card carriage and the read/write head writes information onto the magnetic stripe during the second forward pass of the card. The card carriage 130 is then reversed and moved back beyond the read/write head. The information is verified by the head during a third forward pass of the card past the head. The head 132 contains a read coil and a write coil so that the head performs both write and read functions.

As shown in Figures 10 thru 12, the embosser card carriage 130 slides along a shaft 131 being rotatable for rotating the card carriage 130 into the card transport path and out of the card transport path thereby engaging and releasing the card. The tilting of the card carriage 130 is restricted by a retaining block 140 shown in Figures 11 and 12, which permits rotation of the carriage 130 only at the entrance and exit of the ends of the card transport path. The carriage includes a carriage body having a pair of tangs 142 protruding beyond the rest of the carriage body. The tangs are spaced at least a card-length apart so that a card is engaged between the tangs 142. The retaining block 140 has reliefs at the entrance and exit ends of the card transport path, respectively, allowing rotation of the card carriage into and out of the transport path for engaging and releasing the card.

Upon completion of the encoding process, the card carriage 130 is tilted back, releasing the card so

that the rollers 63e,f deliver the card out of the encoder apparatus and into a slot between two walls of a card alignment stop 150.

While various transport systems and embossers might be utilized, the transport system and method for embossing used in the embodiment shown are described and illustrated in serial number 276,233, filed November 23, 1988. A sensor 62e detects when the card is delivered into the card alignment stop 150. A signal is then relayed to the card personalization controller 30, which signals idler rollers 63h,j located on card issuance and card reject roller sets 63g,h and 63i,j to be retracted by solenoids 160a,b so as to allow the card transport mechanism 214 to pass downward between the card issuance and card reject roller sets 63g,h and 63i,j in order for the card transport mechanism 214 to pick up the encoded or rejected card that has been delivered to the card alignment stop 150. The card transport mechanism 214 is slidably mounted by brackets 164a,b on rails 168a,b. The stop 150 aligns the card 39 parallel to the transport rails 168a,b so that the card is properly aligned for gripping by the transport carriage 38.

As illustrated in Figures 14 and 15, grippers 178a,b are mounted on pivoting arms 180a,b on the card transport carriage 38, and compression springs 184a,b force the arms to pivot so that the grippers close onto the card. To open the card grippers, a solenoid 160c pushes bumpers 190a,b against an upper portion of the pivoting arms, thereby pivoting the bottom portion of the arm open for receiving the card 39. The solenoid bumpers 190a,b then release the upper portion so that the compression springs 184a,b pivot the lower portion of the arm to a closed position onto the card. The card is then transported over to and into the embossing apparatus by the card transport system while the card transport carriage 38 is gripping the card 39.

While various commercial embossers might be used, the embodiment shown utilizes an embosser similar to that shown in Serial Nos. 276,235 filed November 23, 1988 and 464,569 filed January 16, 1990. As shown in  
5 Figure 13, the embossing apparatus 48 includes an embossing wheel 200 and a drive mechanism 80f for rotating the wheel. The embossing wheel 200 includes associated punches and dies for embossing characters onto the card. The embossing wheel 200 comprises a  
10 punch side and a die side, each having a ring of character blocks spaced around the periphery of the wheel corresponding to the same character block on the opposite side. The card 39 is transported to a position so that the embossing location on the card is between  
15 the punch and the die sides corresponding to an embossing position which is at the top character position of the embossing wheel.

The wheel 200 is then rotated to the embossing position, whereat the punch and die blocks of the  
20 selected character align with the character embossing location on the card. Drive solenoids 204,206 on each side of the wheel are actuated, driving a shaft having a hammer attached thereto. A first hammer strikes the character punch, driving the punch against the card,  
25 while a second hammer on the opposit side strikes the opposing die for forming a raised character. A guide plate 208 on both sides of the card aligns the card between the embossing wheel sides. The guide plate is adjusted so that one side acts as a card bow control  
30 guide plate. The card bow control guide plate 208 supports the card so that the card bowing during and after embossing is minimized. The card positions are adjusted relative to the card bow control guide plate to set emboss height and to minimize card bowing. The  
35 solenoids provide two pulses during operation. A first short pulse having a low current drives a shaft so that the hammer pushes the character block against the card.

The second pulse has a higher current held for a longer duration for driving the character block into the card, forming a raised letter.

Each of the solenoid shafts is attached to a plate 209 at the rear of the shaft. Upon actuation of the shaft, the plate strikes the bumpers 207 on the rear of the solenoid body. The bumpers have a high damping ratio for absorbing the shock of the plate during actuation of the solenoid and for reducing noise. The shaft's motion is stopped at the same point of each stroke as the plate strikes the rear of the solenoid body so that consistent embossed height is attained. Character return plates are located on each of the outer sides of the embossing wheel for returning the character punch blocks and die blocks back to a home at-rest position. The character return plates also engage pushers on the shaft, aiding the shafts in returning to a home position. Once a character is embossed, the solenoids are disengaged, and the shaft retracted so that the hammer disengages the character block and the pusher disengages the character return plate. The character return plate pushes the character block back to a home at-rest position. The card 39 is then positioned by the card transport system for embossing at the next character location. The wheel 200 is rotated so that the selected character punch and die blocks are at the embossing position and the solenoids 204, 206 are actuated, repeating the character embossing steps until the card is finished.

Now referring to the additional card transport operational features, a stepper motor 80d drives the card carriage across a transport rail 212 spanning the entire length of the card transport path. A cable pulley drive system 215 provides the motion for the card carriage. The transport rail 212 moves up and down the vertical rails 168a, b driven by a second stepper motor 80e and belt/pulley arrangement 79. The distance of the

carriage along the transport path is not measured, but determined in both the horizontal and vertical position by the number of steps moved by each of the stepper motors 80d,e. In operation, the transport carriage 38 is moved to its home position as detected by sensors 62i,f before picking up each card. The card transport carriage 38 then moves to the desired location as the stepper motors 80d,e advance the necessary number of steps in both the horizontal and vertical directions to obtain the proper position.

Sensing at various locations along the transport path ensures the card is in the proper position so that no slipping or jamming has taken place. Stops along the transport path are programmably controlled by an interface to the card transport system as well as programming the original stops for processing of the cards. Adjustments may be made if the transport mechanism becomes misaligned. Changes may also be programmed to add stops or to ignore stops that are not required. The card carriage retains the card across the entire transport path and does not release the card at individual processing stations. Therefore, the processing mechanisms do not transport the cards, providing for greater flexibility in processing mechanism configuration.

After the card is embossed or picked up to be rejected, the card transport mechanism 214 will be moved up vertically along the rails 168a,b driven by the stepper motor 80e. The card transport mechanism 214 passes through the issuance and reject idler rollers 63h,j which are again retracted by solenoids 160a,b. The sensor 62f will signal the personalization controller 30 that the transport mechanism 214 has reached the home position. The card personalization controller 30 then causes the idler rollers of the issuance and reject roller sets to return to their original positions.

If the card is to be issued, the card transport carriage 38 will be driven toward the front of the card issuer apparatus 20 for delivery at the card presenting slot 34. As the card is driven forward by the stepper  
5 motor 80d, the card will pass through an alignment guide 220 that is mounted onto the framework of the retractable idler roller 63h of the card issuance roller set 63g,h. When the card is delivered into the alignment guide 220 and is slightly engaged in the card  
10 issuance roller set 63g,h a sensor 62g signals a solenoid 160d with bumpers 224 to press against the upper portion of the pivoting arms of the card carriage 38 and release the card. In a preferred embodiment of the invention, a door normally closing the card  
15 presenting slot 34 will then open. The card issuance roller set 63g,h then moves the card 39 through the card presenter slot 34 on the front of the card issuer apparatus until sensor 62p detects passage of the card at which time the roller set 63g,h is stopped.

20 The delivered card is still retained slightly by the roller set 63g,h. When the card is removed, sensor 62g signals card removal. The door is then closed. The system controller 22 is then notified of completion of the card personalization process. If the  
25 delivered card 39 is not removed from the slot within a predetermined time; e.g. 30 seconds, the card issuance roller set 63g,h retrieves the card back into the card issuer apparatus 20, where the sensor 62g will signal the solenoid 160d with bumpers 224 to press against the  
30 upper portion of the pivoting arms of the card transport carriage 38. The solenoid 160d will then retract, and the card carriage 38 will grip the card so as to transport the now-rejected card towards the rear of the card issuer apparatus 20 and slightly insert the  
35 rejected card into the reject roller set 63i,j. The solenoid 160e is then actuated to release the card from the card carriage 38. Roller set 63i,j are then driven

until sensor 62h detects passage of the card. Reject stacker solenoid 160f drives a shaft having a hammer 242 attached thereto. The hammer 242 strikes an anvil 244 attached to a pivotal deflecting member 246 pivotal about point 248 and directs the card 39 into a retention area 250 of the secure reject box 56. Serial No. 276,236, filed November 23, 1988 also describes and illustrates a similar deflection and retention arrangement.

10           If the card had been rejected earlier in the system such as after encoding but before embossing, the rejected card would have been picked up at the alignment stop of 150 of the embossing apparatus 48 and transported up vertically along the post driven by the  
15 stepper motor as described earlier.

Referring to Figure 16, there is shown in block diagram form an embodiment of a card transaction processing flow for issuing a personalized card from the issuance apparatus 20. At block 260, the system  
20 initialization is performed. The system is powered up, the various peripherals are initialized, including the embosser 48. The status of the issuance apparatus 20 is reported to the host and locally. The host computer will send the appropriate commands to place the issuance  
25 apparatus 20 in operation. Once in normal operation, at block 262, a main menu will be displayed at the issuance apparatus 20. The main menu will be displayed until a user initiates a transaction. It will be appreciated that alternative menus might be displayed. For example,  
30 menus might be displayed to provide information and/or to provide advertising.

At block 264, the user selection of a function is illustrated. Possible user options include requesting an emergency card, requesting a new card for  
35 an expired card, requesting a substitute card for a lost/stolen card, and/or requesting a new card for which the user has recently been approved.

Once the user selects an option, at block 266 the issuance apparatus 20 enters the input authorization mode. If the user has a card, the card can be inserted by the user and received and read in the magnetic stripe reader 46. If the user does not have a card or additional information is required, the user can input data through the keypad 28. Such data might include a personal identification number (PIN), account number, and bank authorization number. The function select will typically be accomplished using the soft key panel 29. In the preferred embodiment, there will be a soft key labelled for each user option.

Once the user has entered data, at 268 the data or information is processed. In the preferred embodiment, there will be local verification of the information. This will be accomplished by restructuring the information for transfer to the host computer 64. Block 270 illustrates transfer of the information or data to the host computer 64. Upon verification of the data, the issuance apparatus 20 will receive authorization from the host computer. The host computer in the preferred embodiment will send an entire card data record including user name, address, account number, and other additional information to be placed on the card in one form or another. It will be appreciated that in some embodiments or modes of operation the data might be already contained within or generated by the card issuance terminal 20 so as to provide for local authorization the card issuance terminal 20 without first communicating with a host computer. For example, the data might have been previously downloaded from the host such as when the transaction was approved by the lending institution. Thus for example, a card holder might have authorization for multiple cards. This information might be downloaded once or periodically from the host. Thus when the user requests multiple

cards, the authorization for multiple cards will already reside in the card issuance terminal.

Once authorization is received, at block 272, card production and personalization will commence. In  
5 the preferred embodiment, the card will be picked from one of the containers 45 and its type will be verified. Verification of the card type is accomplished by reading a pre-encoded code on the card, e.g., encoded on the magnetic stripe. If the pre-encoded code indicates the  
10 card type is proper personalization will continue. If not, the card will be stored in the card reject storage apparatus 56. (The pre-encoded codes will typically be placed on the card by the card issuer so as to identify its cards.) An alternate embodiment of the invention  
15 might use card containers 45 which identify the type of cards they contain. This might be accomplished in any number of ways. For example, the card container might physically be configured by the use of slots or the like, the card container might contain its own local  
20 intelligence for reporting to the system controller 22 over a data bus, etc. In addition the containers 45 might have local intelligence which would enable them to be opened upon commands received from the system controller or host.

25 The card will then be encoded and if no errors occur during the encoding process, the card will next be embossed. In the present embodiment, the top of the card will then be colored. Once the card has been personalized, at block 274 the card is issued to the  
30 customer. As previously discussed, if the customer does not take the card within a predetermined time period, the card will be retrieved back into the unit and disposed in the rejected card storage apparatus 56.

At blocks 276 the transaction is closed out.  
35 This is accomplished by first capturing or returning the card placed in the magnetic strip reader, if in fact a card was so placed. Next, a transaction issue receipt

is printed and issued to the customer. The transaction is recorded on a log file of the issuance apparatus 20. The issuance apparatus 20 then updates the host status and returns to the main menu display which is the normal idle state display.

Illustrated in Figures 17 and 18 are electrical schematics of an embodiment of a card issuance apparatus in accordance with the present invention. Figure 17 illustrates interconnection of the peripherals to the system controller 22. As illustrated the card issuance apparatus 20 embodiment is shown as including a speaker 40 and a service terminal port 41 enabling hook up of a service terminal for testing and servicing purposes. In addition, the power supply 60 is illustrated as being filtered by a filter 31. One of the outlets on the filter is illustrated as being interconnected to the embosser. Illustrated in Figure 18 is an electrical schematic illustrating interconnection of a card personalization controller 30 to the system controller 22.

Shown in Figures 20 thru 24 is an embodiment of the card container 45 utilized in the embodiment of the invention shown. It will be appreciated that various other embodiments might be utilized. As illustrated in Figures 20 and 21, the container includes a tray portion 250 having a cover 252 and a door 254 at one end of the tray portion 250 from which the cards are picked. A ratchet handle 256 is used to open and close the door 254. The card pusher assembly which biases the stack of cards 39 toward the door 254 includes two springs 258 mounted on a plastic block 260. The springs are wound up in a coil on the block and are fixedly attached at the door end of the container 45. Accordingly, the springs tend to bias the card stack toward the door. A weighted block 261 is present to provide the pusher assembly with some additional mass so as to slow down the rate at which the pusher assembly 110 moves the card stack. The

puuher assembly 110 includ s a guide member 262 which follows a channel 264 in the tray 250. Vertical walls 251 retain the cards in plac on the tray 250. An elongated member 266 is attached to the pusher assembly 5 110 so as to be aligned with two apertures 268 & 270 proximate the door end of the container 45. The apertures have corresponding sensors for sensing the presence of the member 266. The first aperture 268 represents a card low status and the second aperture 270 10 represents an empty status. The card pinch members 106 are attached by brackets 47 to a side wall of the container 45.

As previously mentioned the card container cover 252 and door 254 can be secured during transport 15 of the container 45 to the card issuer terminal 20. Figures 21 and 22 represent the container 45 in the secured configuration with the cover and door locked in a closed, secured position. As illustrated a door locking arm member 274 is pivotally biased about a pivot 20 point 276 by a spring 278 into a locking position so as to prevent movement of the door 254. In the locked position, a shoulder portion 280 of the member 274 engages a frame member 280 of the door 254. A cover locking member 282 is pivotally biased about a pivot 25 point 284 by a spring 286 into an unlocked position. However when the door 254 is closed, a projection 288 on the door frame member 280 engages a tab portion 290 of the cover locking member 282, so as to pivot the cover locking member 282 into the locked position. In the 30 locked position, a groove 292 of the cover locking member 282 engages a horizontal projection 294 which is fixedly attached to the container 45, thereby locking the cover 252.

To unlock the door, a key 296 is inserted into 35 a lock mechanism 298 and turned counter clockwise. Attached to the lock mechanism is a projection 300 which engages an end 302 of the door locking member 274 as the

lock mechanism is rotated so as to move the door locking member 274 counter clockwise. Upon being so as to be generally aligned with a longitudinal axis of the container 45, an upright projection 304 of the door locking member 274 engages a groove 306 of the latching member 308 pivotally biased about a pivot point 310 by a spring 312. Upon engaging the groove 306 of the latching member 308, the door locking member 274 is retained in the released or unlocked position. The door locking member 274 is now aligned with a recess 314 in the door frame 280 so as to allow the door frame 280 to be slid along the member 274. However, at this point in time the cover 252 is still secured by the door frame 280.

In Figure 24, the door 254 is illustrated as having been opened. To open the door once the door has been unlocked by use of the key, the ratchet handle 256 is turned counter clockwise whereby a ratchet spool 316 cooperates with a ratchet portion 318 of the frame 280 to move the door 254. Upon moving the door 254 into the open position, the projection 288 on the door frame 280 moves away from the member 282 locking the cover thereby allowing the member 282 to be biased by the spring 286 into an unlocked position. Cards can now be picked from the container 45 and the cover 252 can be closed without it being locked. Upon being open, a door frame portion 320 engages an end portion 322 of the member 308 so as to pivot from the member 274 as shown in figure 24. Thus upon closing the door closing the door 254, the member 274 will be biased into the position as shown in Figure 22, thereby locking the door 254. Likewise, if the cover 252 is closed before closing the door 254, it also will be locked or secured.

When the door 254 is opened using the ratchet handle, an elongated lever 324 will extend through an opening 326 in the container 45 so as to project below the container (not shown) into an opening of the frame

of the multiple input hopper 44 so as to retain the container in place in the hopper. A locking mechanism or other arrangement might then be used to secure the ratchet handle 256 against rotational movement. It will  
5 be appreciated that while a specific embodiment of the container has been described, numerous other embodiments of the container might be used in keeping with the principles of the invention.

In is to be understood, however, that even  
10 though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, the disclosure is  
illustrative only, and changes may be made in detail,  
15 especially in matters of shape, size and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

## WHAT IS CLAIMED IS:

1. A remote, unattended card issuer apparatus, comprising:

user interface means for entry of user information including user identification and for requesting issuance of a card personalized so as to contain user specific information;

system controller means for receiving the user information including user identification, the system controller means being in communication with a remote host computer system for transmitting user information therebetween; and

card personalization means for personalizing a card with user specific information including user identification under control of the system controller means.

2. An apparatus in accordance with claim 1, wherein the card personalization means includes an embosser for embossing the card.

3. An apparatus in accordance with claim 1, wherein the card personalization means includes a magnetic encoder for magnetically encoding the card.

4. An apparatus in accordance with claim 1, wherein the card personalization means includes a multiple input hopper means including a plurality of card containers whereby a plurality of different cards can be personalized.

5. An apparatus in accordance with claim 1, wherein the card personalization means includes input hopper means comprising at least one removable, secured card container for preventing direct access to the container by an unauthorized person.

6. An apparatus in accordance with claim 1, wherein the card personalization means includes storage means for storing cards rejected during the personalization process.

7. An apparatus in accordance with claim 1, wherein the user interface means includes card presenting means for presenting the personalized card to the user.

8. An apparatus in accordance with claim 7, wherein the card presenting means cooperates with the system controller for withdrawing the personalized card back into the card issuer apparatus if the card is not removed by the user within a predetermined period of time.

9. An apparatus in accordance with claim 1, wherein the personalized card is contained within a secured enclosure until presented to the user.

10. A method of issuing personalized cards, comprising the steps of:

- preapproving a user for a personalized card;
- automatically personalizing a card at an unattended card issuance device upon request of the user; and
- automatically presenting the personalized card to the user upon completion of the personalization process.

11. A method according to claim 10, wherein the method of personalizing includes picking an unpersonalized card from a card input hoppper having a plurality of different types of cards.

12. A method according to claim 11, wherein the method of personalizing includes first reading the card to determine its type.

13. A method according to claim 10, including transporting cards to the personalization device in a secured container.

14. A method according to claim 10, including the step of verifying a user's request for a personalized card by communication with remote host.

15. A method according to claim 10, further including the step of withdrawing the personalized card if the user does not take the card within a predetermined period of time after the card is presented to the user.

16. A card issuance device, comprising:

user interface means for allowing user operation of the issuance device without requiring the presence of an operator;

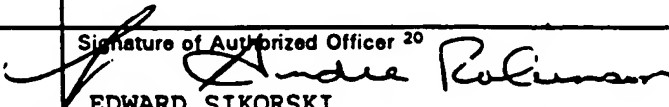
system controller means for controlling operation of the card issuance device; and

card personalization means for personalizing cards and for issuing a personalized card to the user.

17. A device in accordance with claim 16 further including a multiple input hopper means for containing a plurality of card types.

18. A device in accordance with claim 17, including means for reading a card to determine its card type.

19. A device in accordance with claim 18, including means for communicating with a remote host computer.

<b>I. CLASSIFICATION</b> <b>N F SUBJEC</b> <b>ATTER</b> (if several classification symbols apply, indicate all) <sup>3</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC IPC (5): G06K 5/01, 1/12 US CL : 235/380		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>4</sup>		
Classification System	Classification Symbols	
U.S.	235/379-381, 383, 487, 490; 194/241; 264/293; 902/8, 23, 25, 27; 221/135	
Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched <sup>5</sup>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> <sup>14</sup>		
Category*	Citation of Document, <sup>16</sup> with indication, where appropriate, of the relevant passages <sup>17</sup>	Relevant to Claim No. <sup>18</sup>
X Y	US, A 4,641,239 (TAKESAKO) 03 February 1987, See figs. 1,3,4, column 3, lines 19-32; column 4, lines 50-53, column 6, lines 45-57.	1,2,7,9,10, 16 5,13,14
X Y	US, A 4,818,854 (DAVIES ET AL.) 04 April 1989, See Abstract, Fig. 1.	1,7,9,10,16 4,11,17
X Y	US, A 4,385,285 (HORST ET AL.) 24 May 1983, See Abstract, Figs. 1,3.	1,3,7,9,10, 16 6,8,15
X	JP, A 2-22795 (NAKAYO TSUSHINKI K.K.) 25 January 1990, See Abstract.	1,3,7,9,10, 16
Y	US, A 4,794,530 (YUKIURA ET AL.) 27 December 1988, See Abstract, column 2, line 53 - column 3, line 3.	13,14
Y	US, A 4,825,054 (RUST ET AL.) 25 April 1989, See column 2, lines 3-33.	2
Y	US, A 4,778,982 (BEECH ET AL.) 18 October 1988, See Fig. 3, column 1, lines 34-50.	2
Y	US, A 3,483,361 (BLURTON) 09 December 1969, See Figs. 4,5.	4,11,12,17-19
* Special categories of cited documents: <sup>16</sup> "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search <sup>2</sup> 03 JUNE 1992		Date of Mailing of this International Search Report <sup>2</sup> 01 JUL 1992
International Searching Authority <sup>1</sup> ISA/US		Signature of Authorized Officer <sup>20</sup>  EDWARD SIKORSKI

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET		
Y	US, A 5 775,593 (GIERINGER ET AL.) 27 November 1973, See Figs. 1,3).	4,11,12,17-19
Y	JP, A 2-113392 (ANRITSU CORPORATION) 25 April 1990, See Abstract Fig. 1.	5
Y	US, A 4,965,438 (MUROFUSHI) 23 October 1990, See Fig. 2, column 5, lines 1-14.	6,12,18,19
Y	US, A 4,593,183 (FUKATSU) 03 June 1986, See column 4, lines 5-34.	8,15

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE<sup>1</sup>

1. ☐ Claim numbers \_\_, because they relate to subject matter (1) not required to be searched by this Authority, namely:
2. ☐ Claim numbers \_\_, because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out (1), specifically:
3. ☐ Claim numbers \_\_, because they are dependent claims not drafted in accordance with the second and third sentences of PCT Rule 6.4(a).

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING<sup>2</sup>

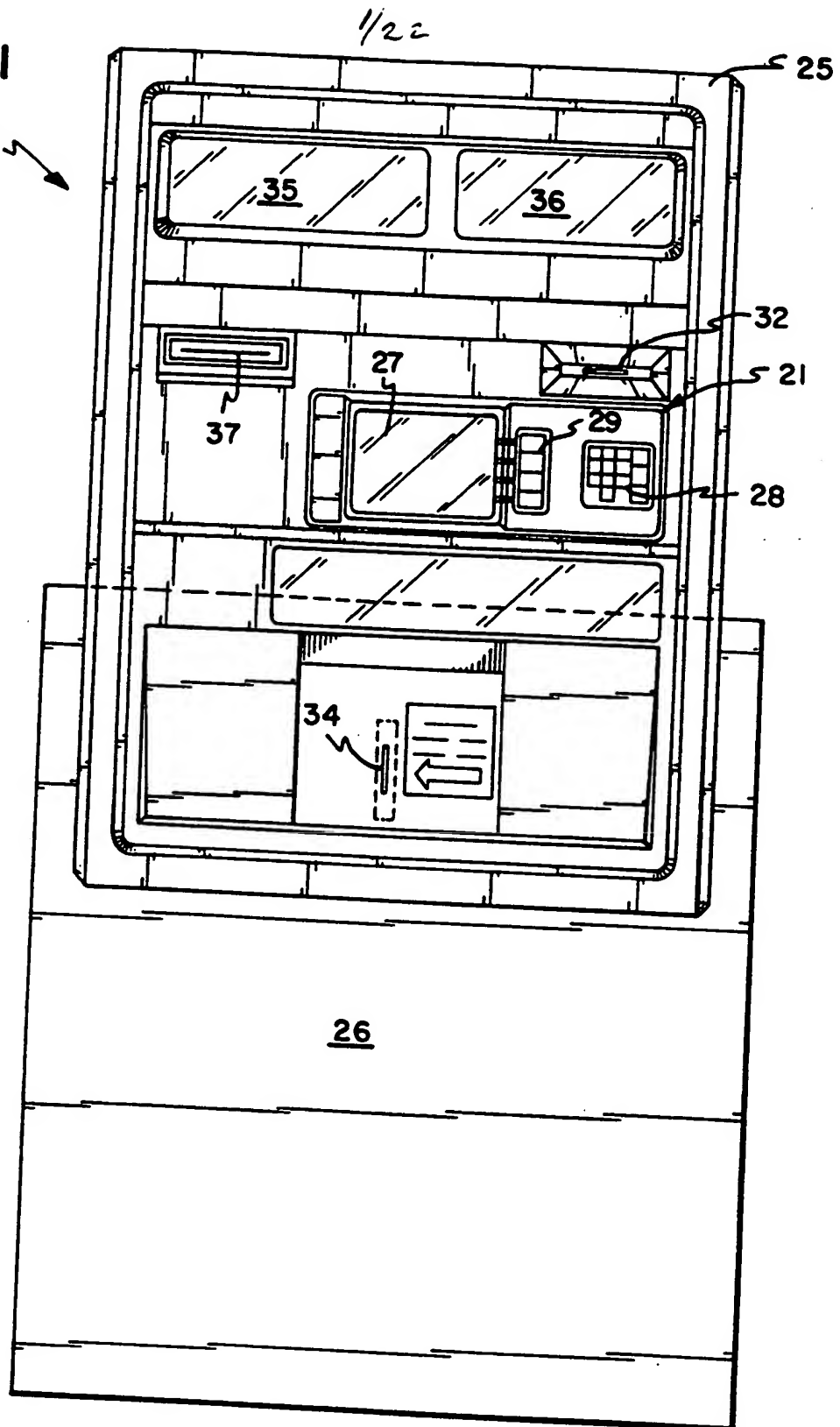
This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.
2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:
3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:
4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Search Authority did not invite payment of any additional fee.

Remark on protest

- ☐ The additional search fees were accompanied by applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

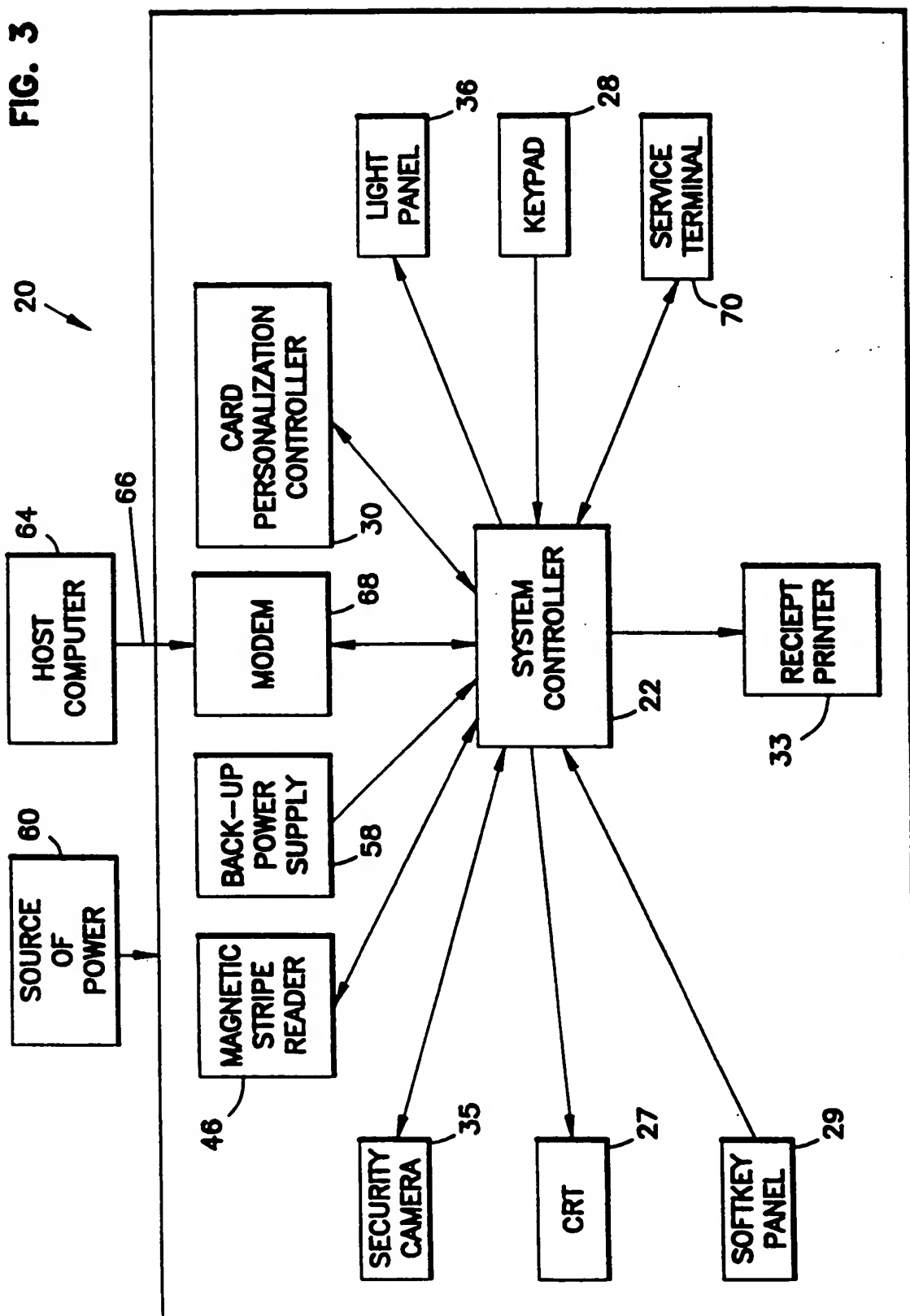
FIG. 1





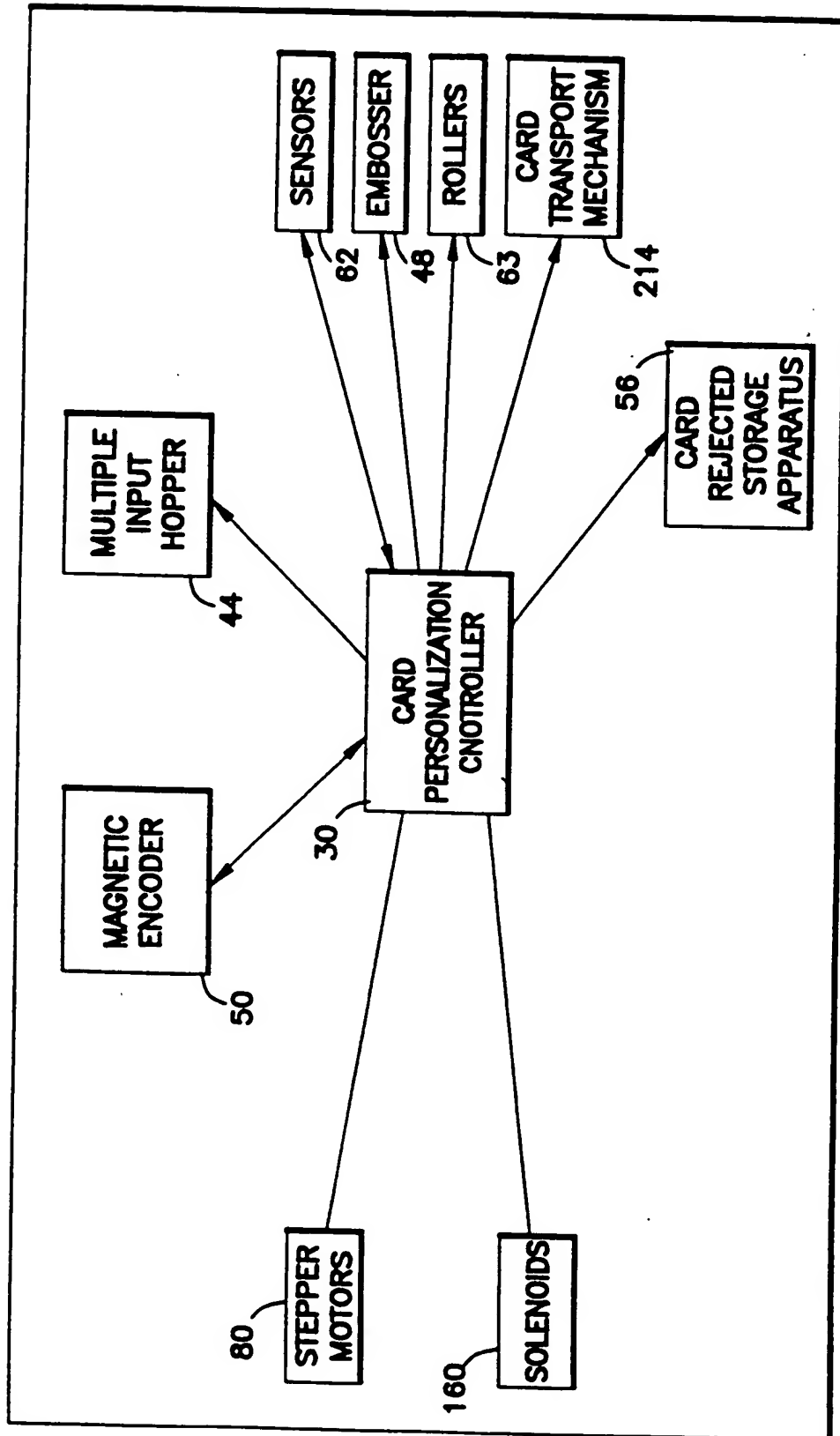
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FIG. 3



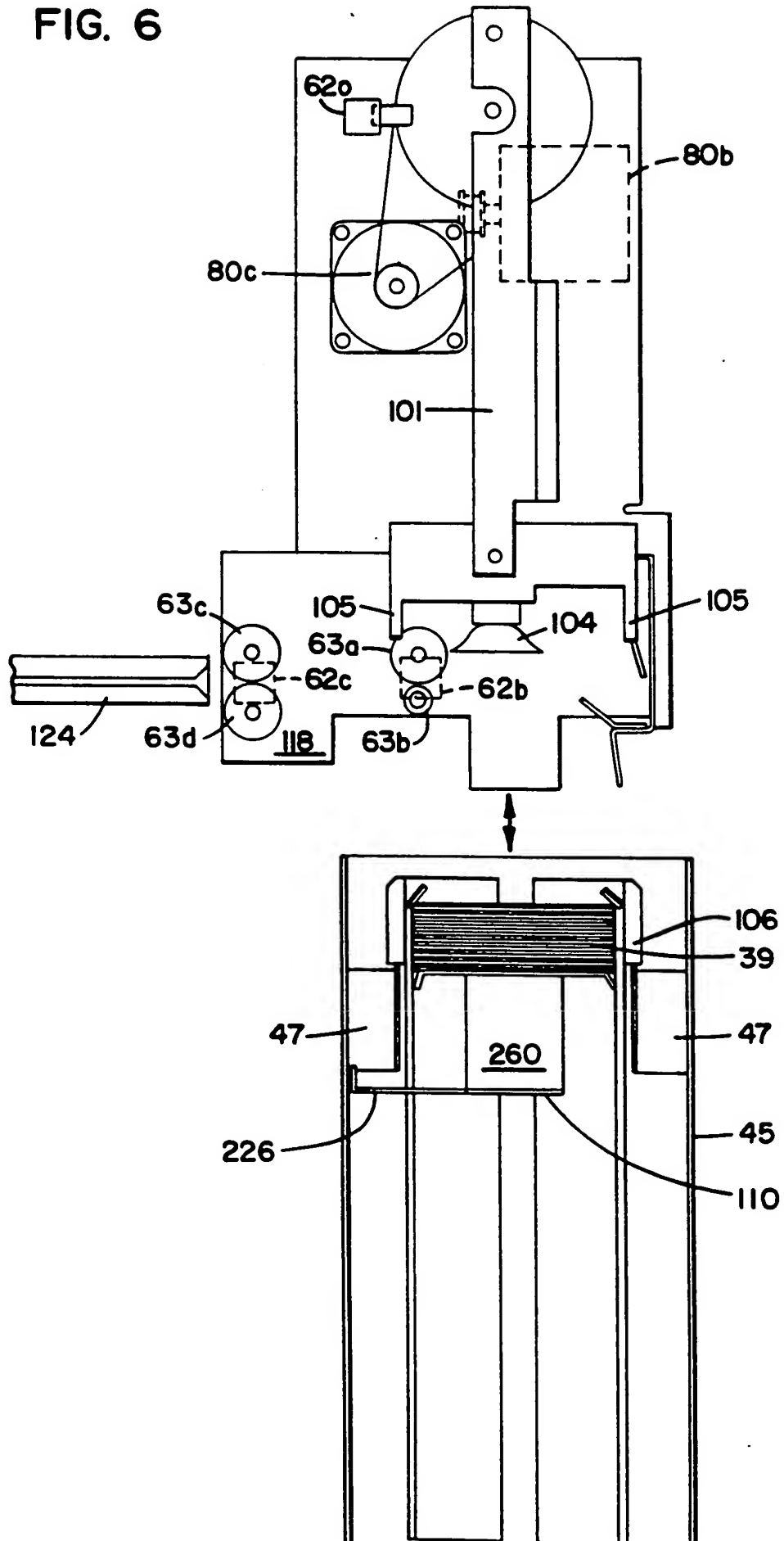
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FIG. 5



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FIG. 6



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FIG. 7

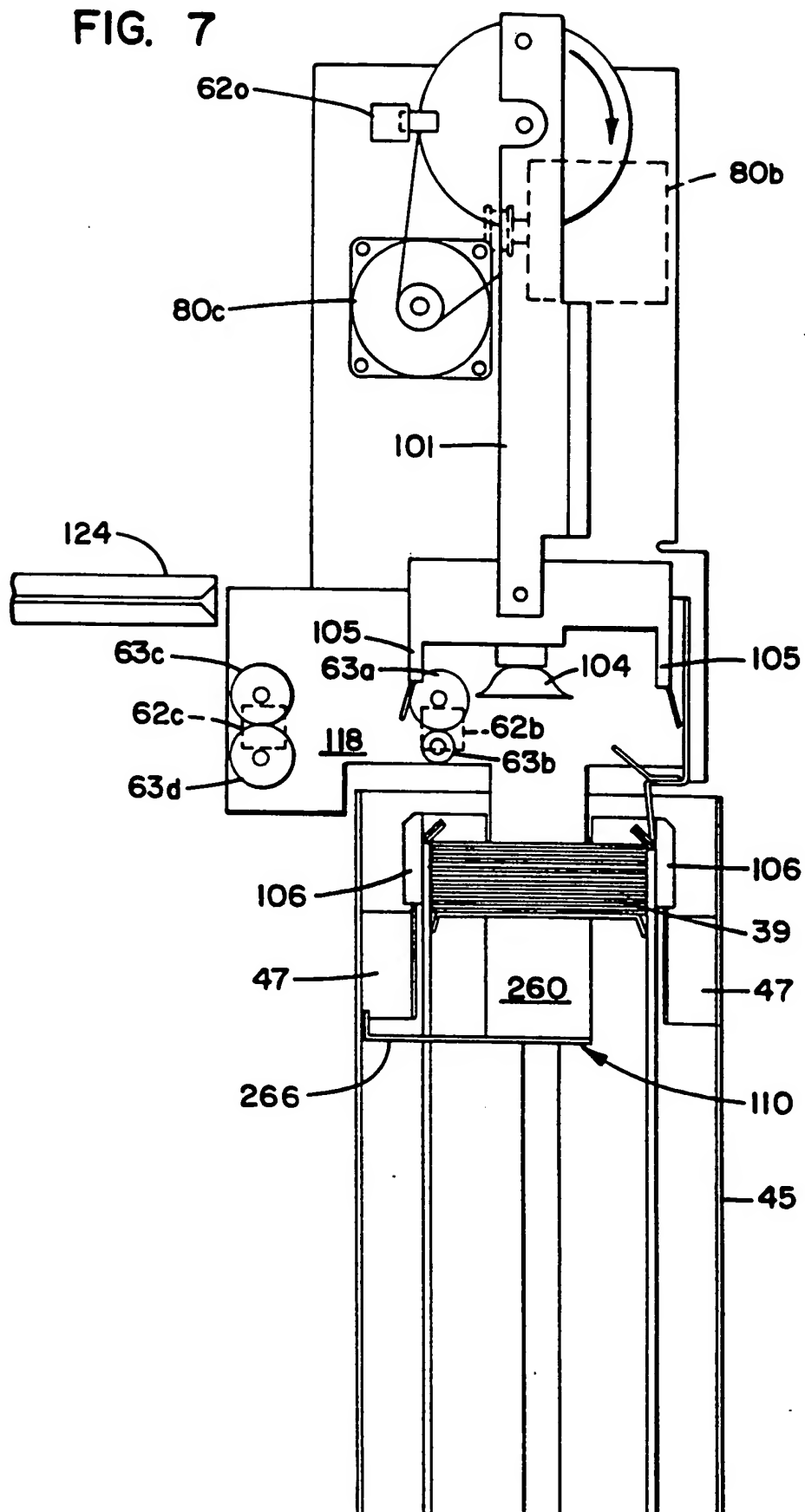


FIG. 8

62a

80b

80c

101

124

118

63c

62c

63d

63a

62b

105

104

106

39

47

260

266

45

110

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FIG. 9

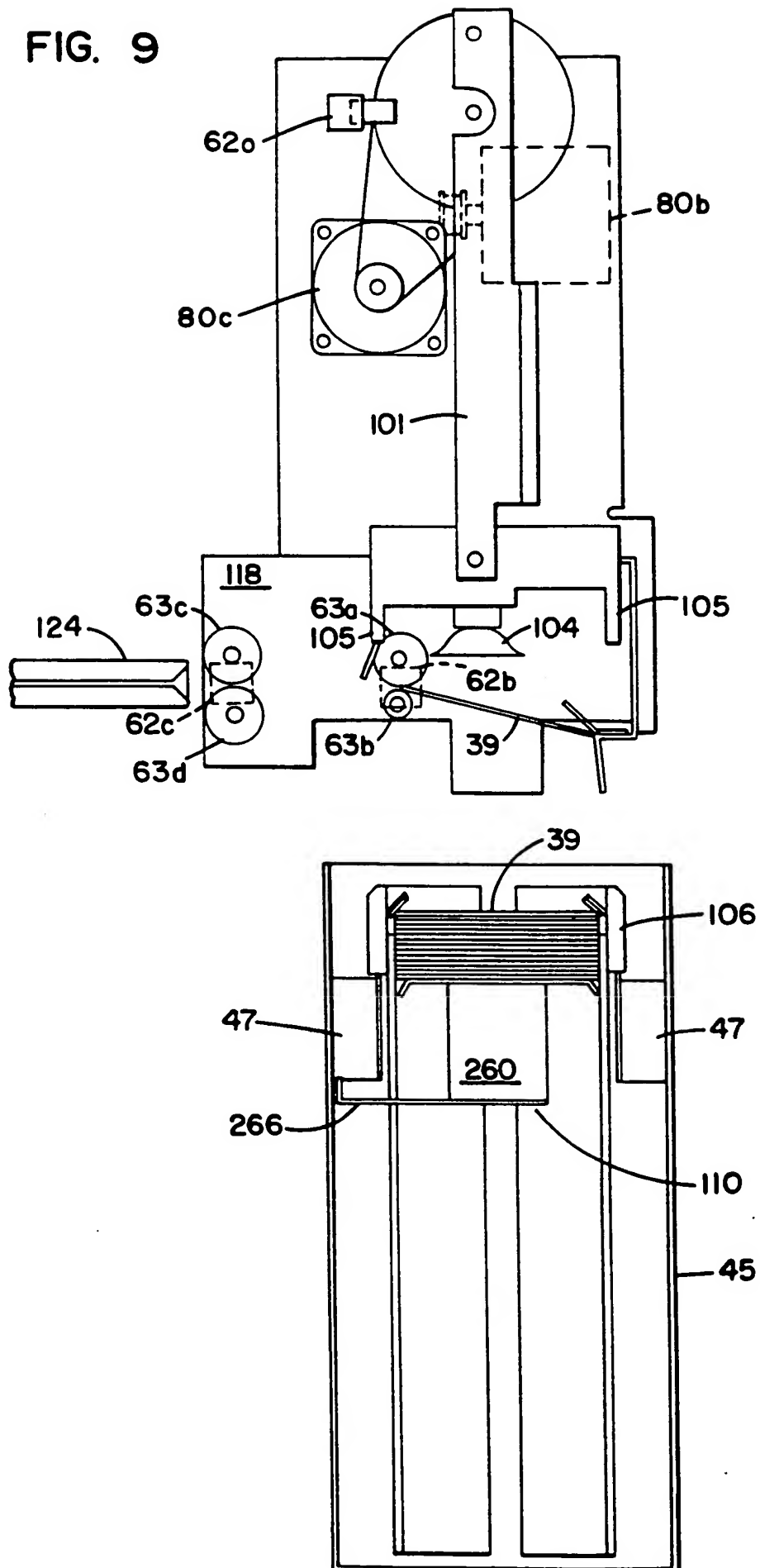
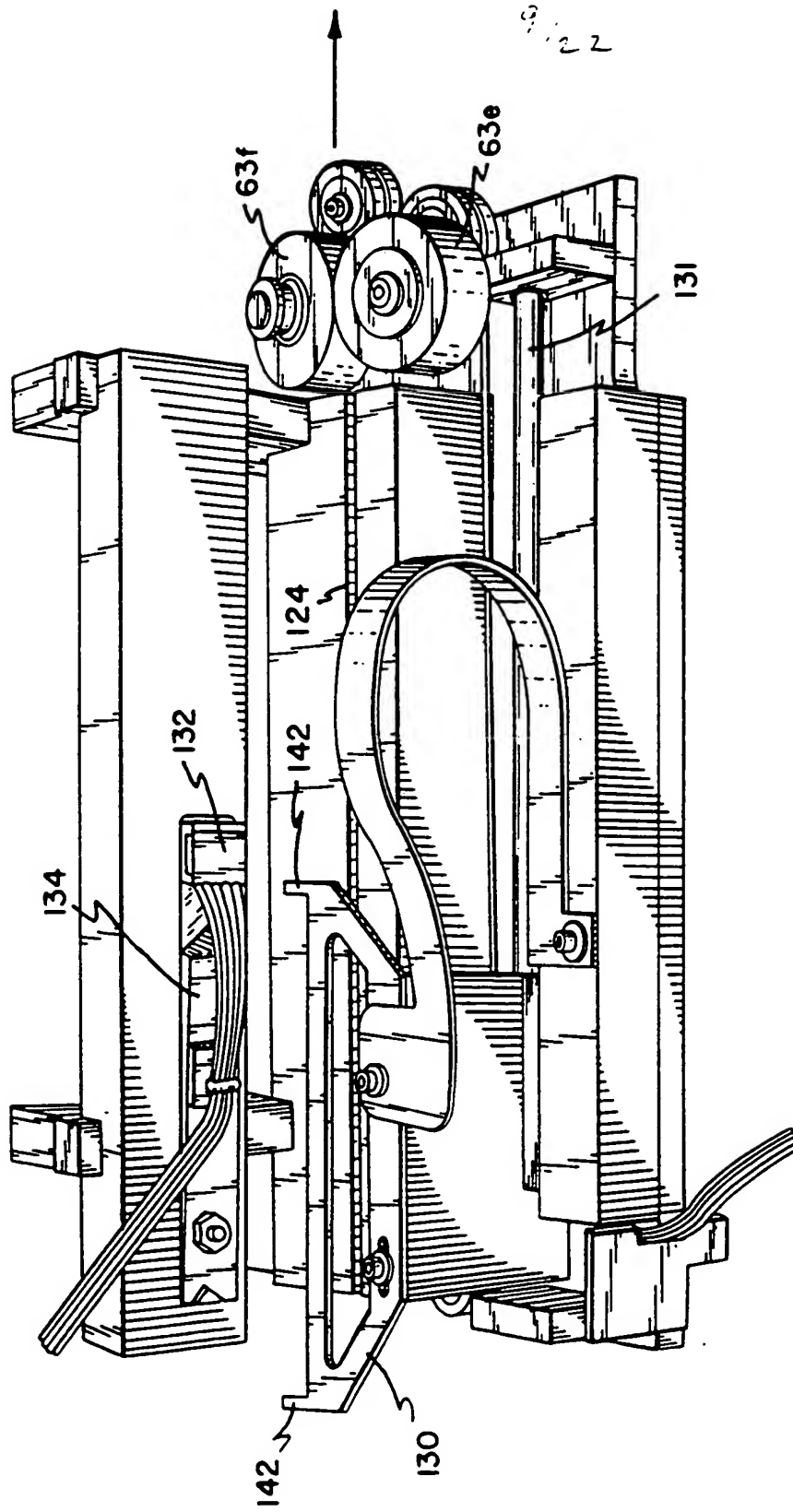


FIG. 10



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FIG. II

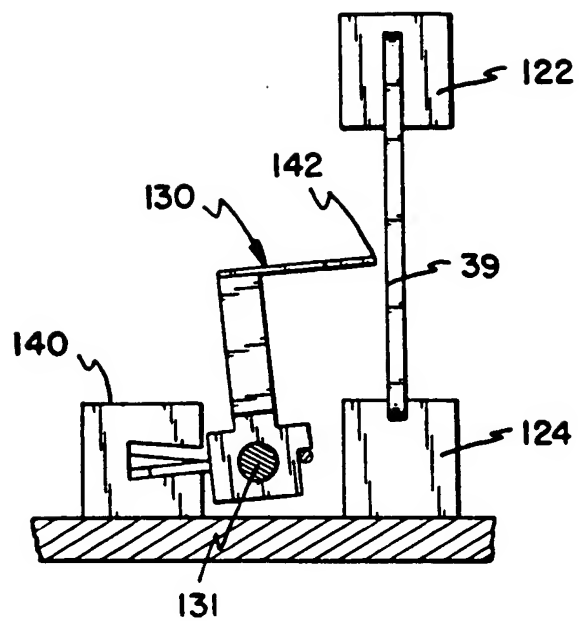
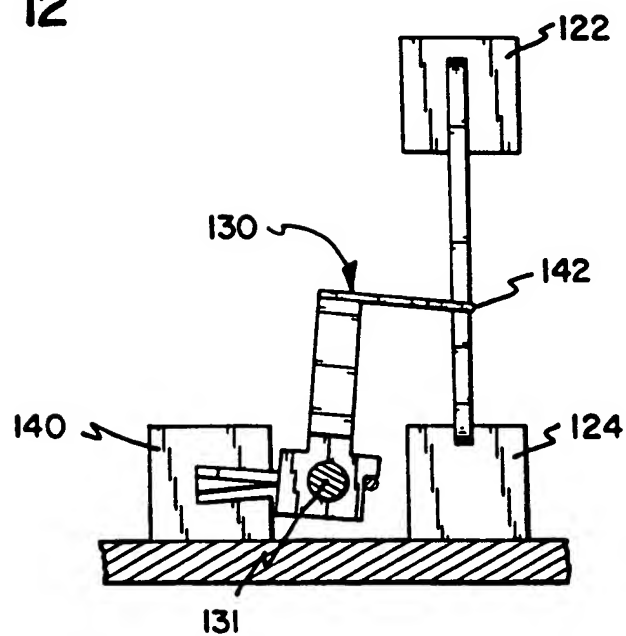


FIG. 12



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FIG. 14

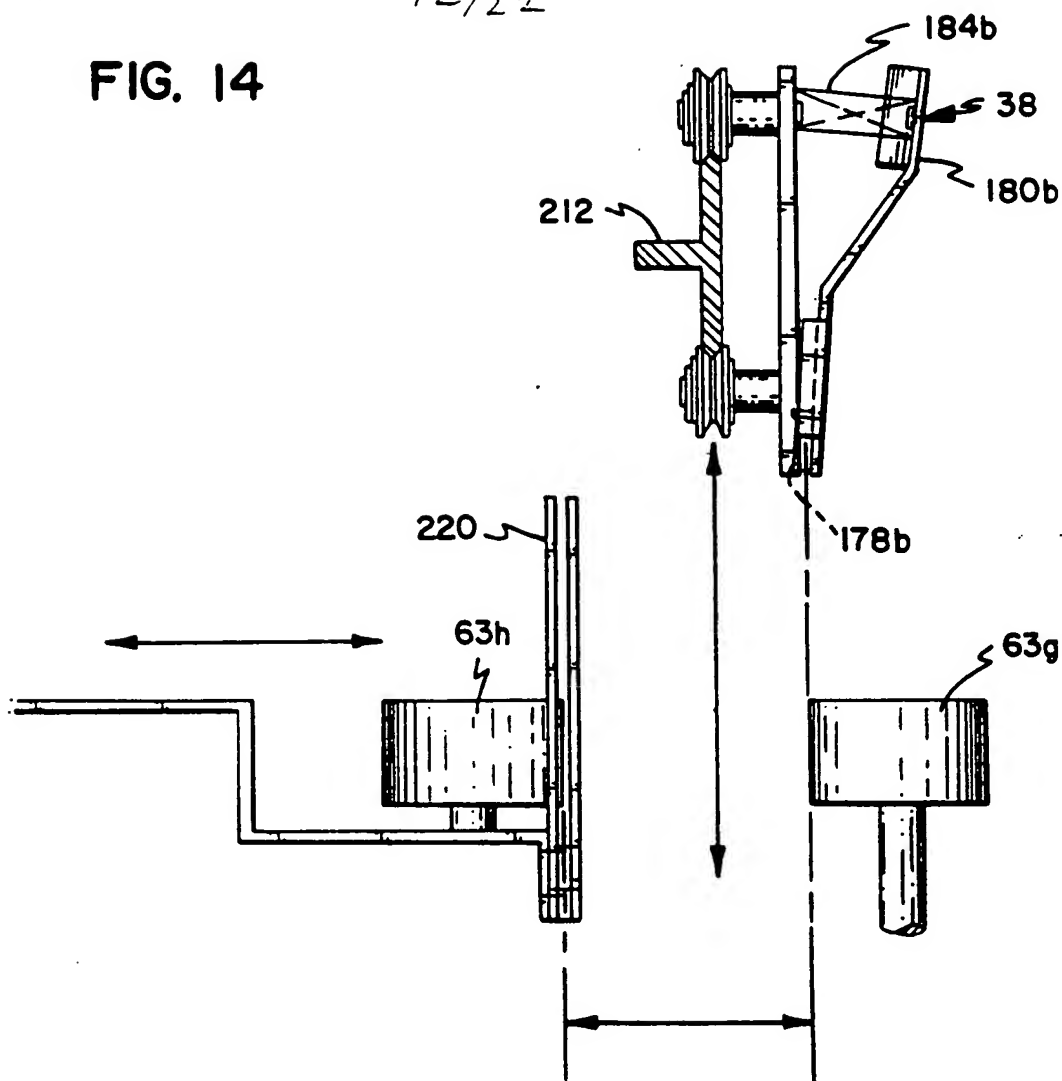
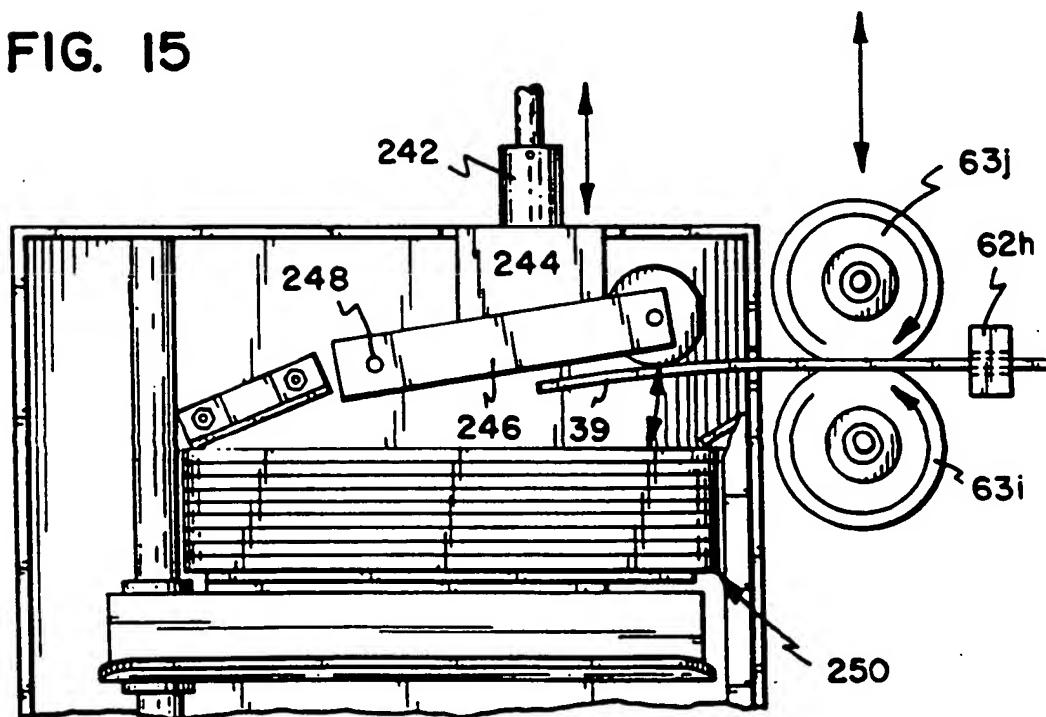
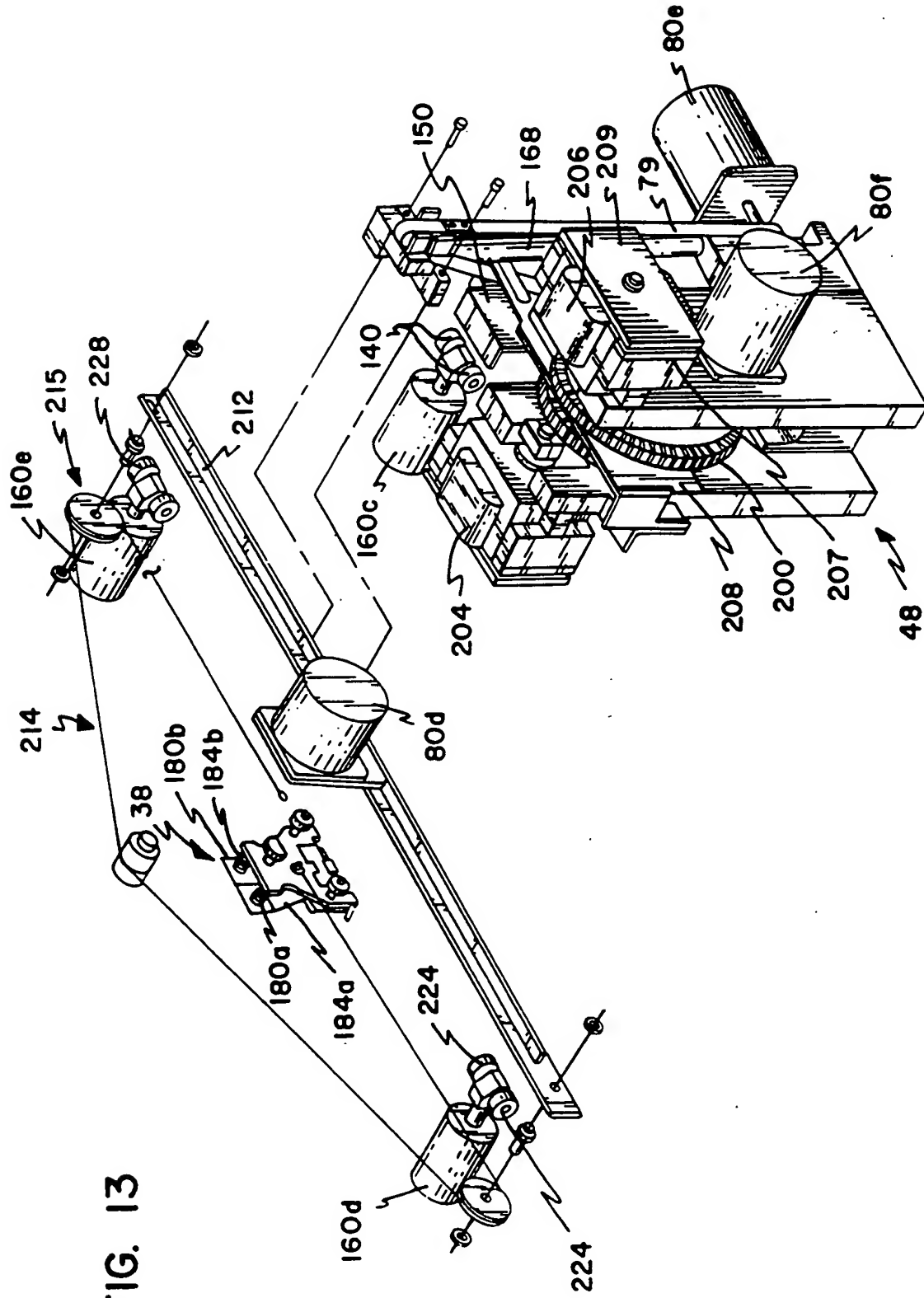


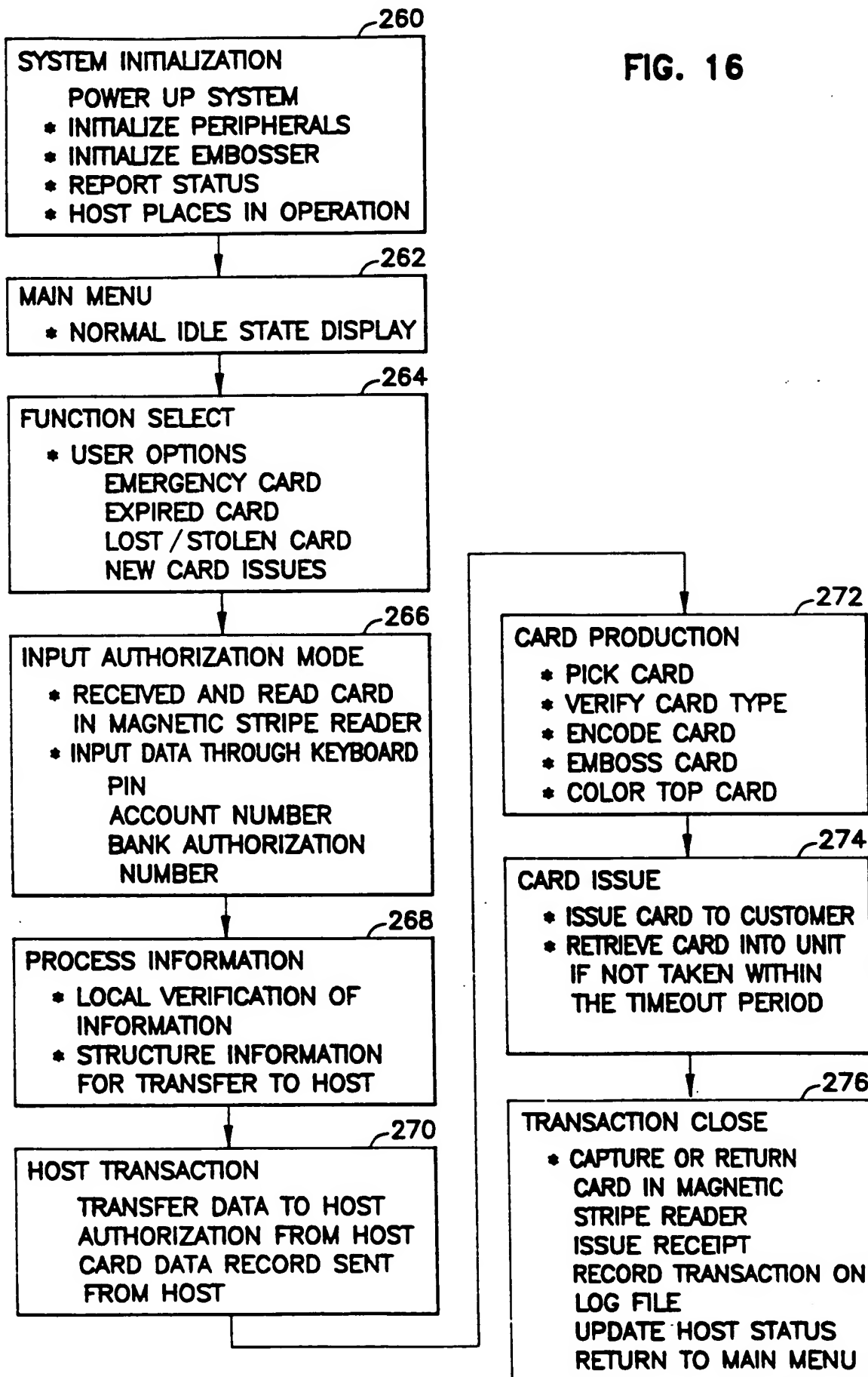
FIG. 15





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FIG. 16



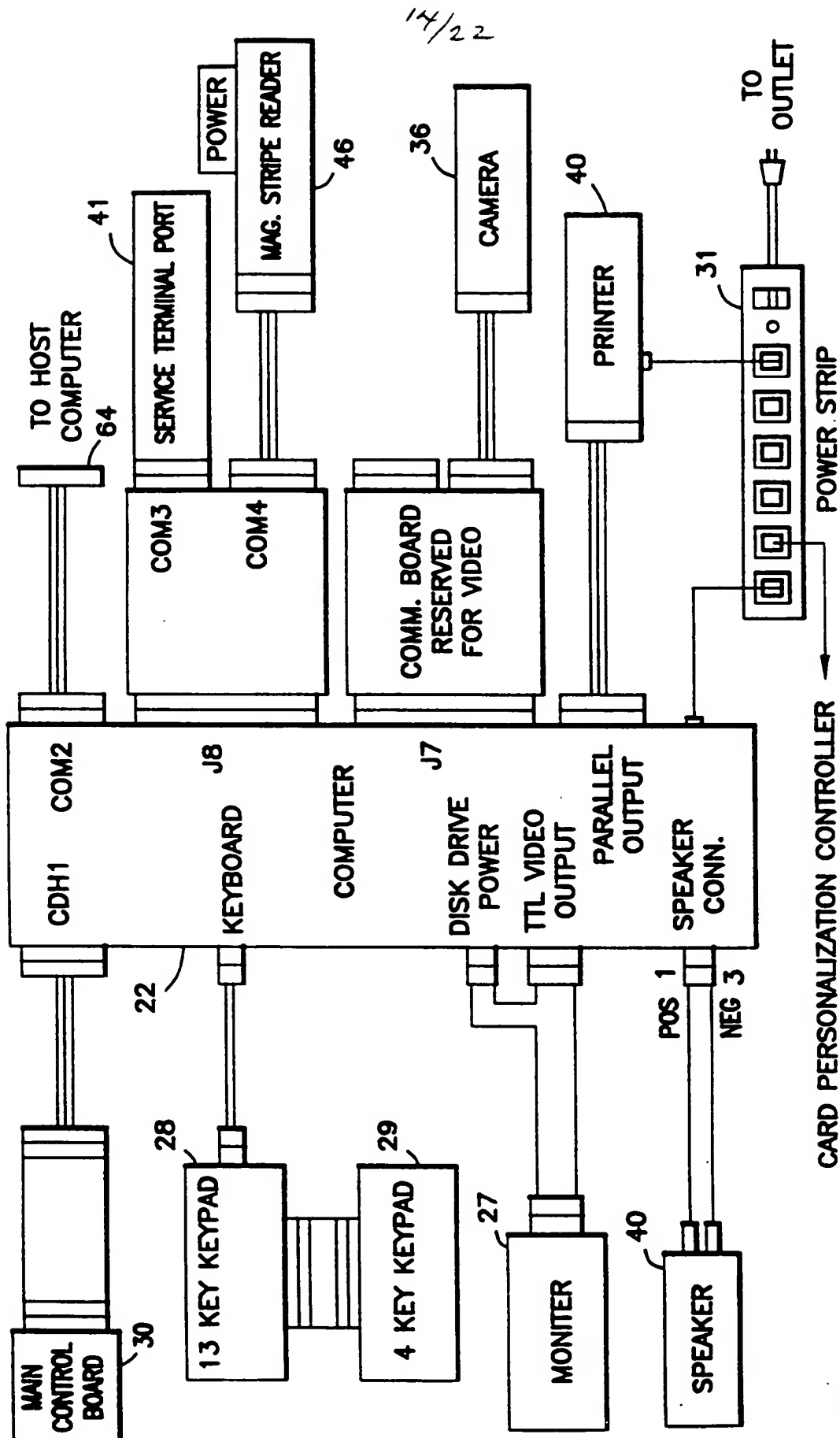
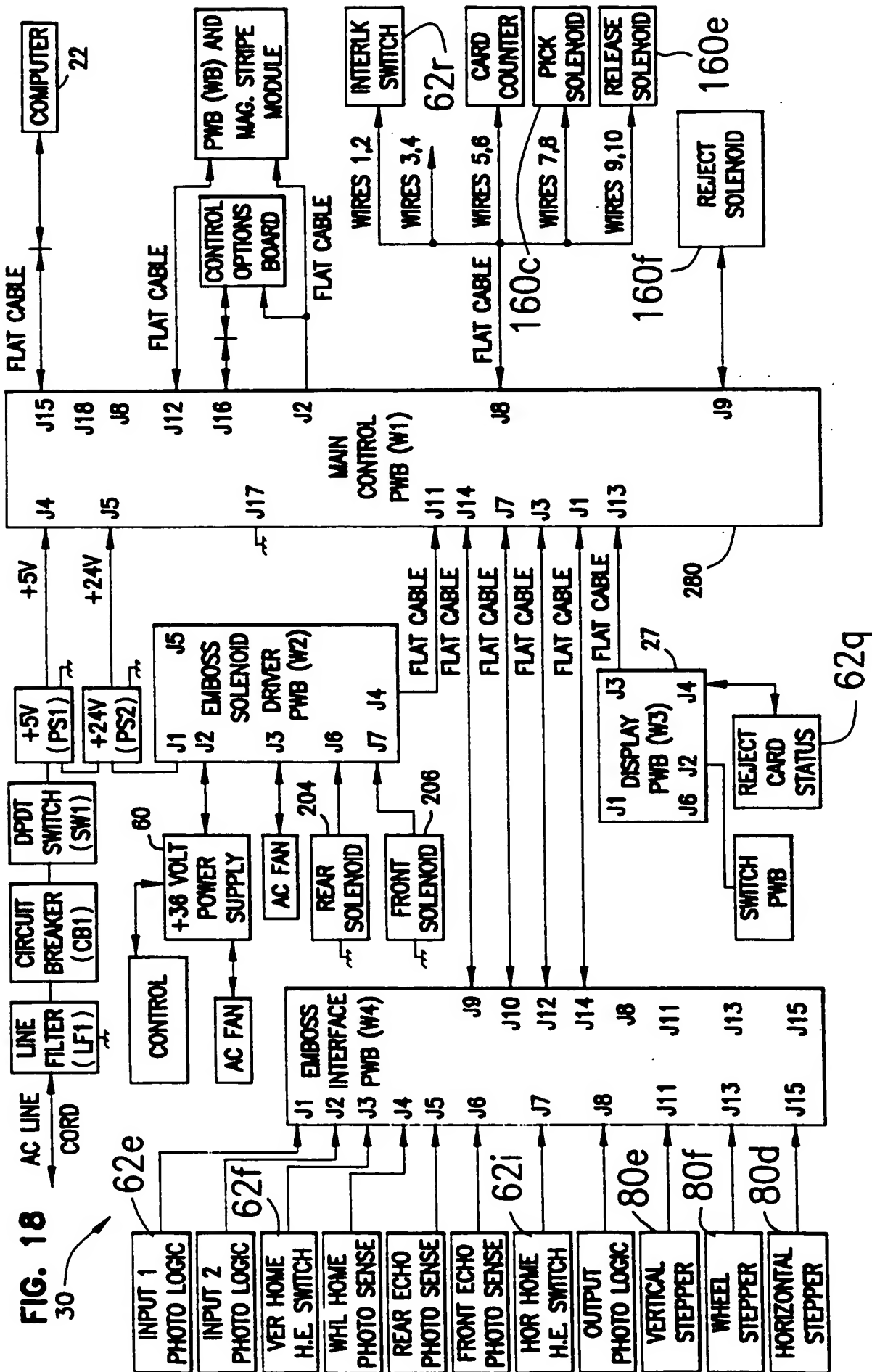


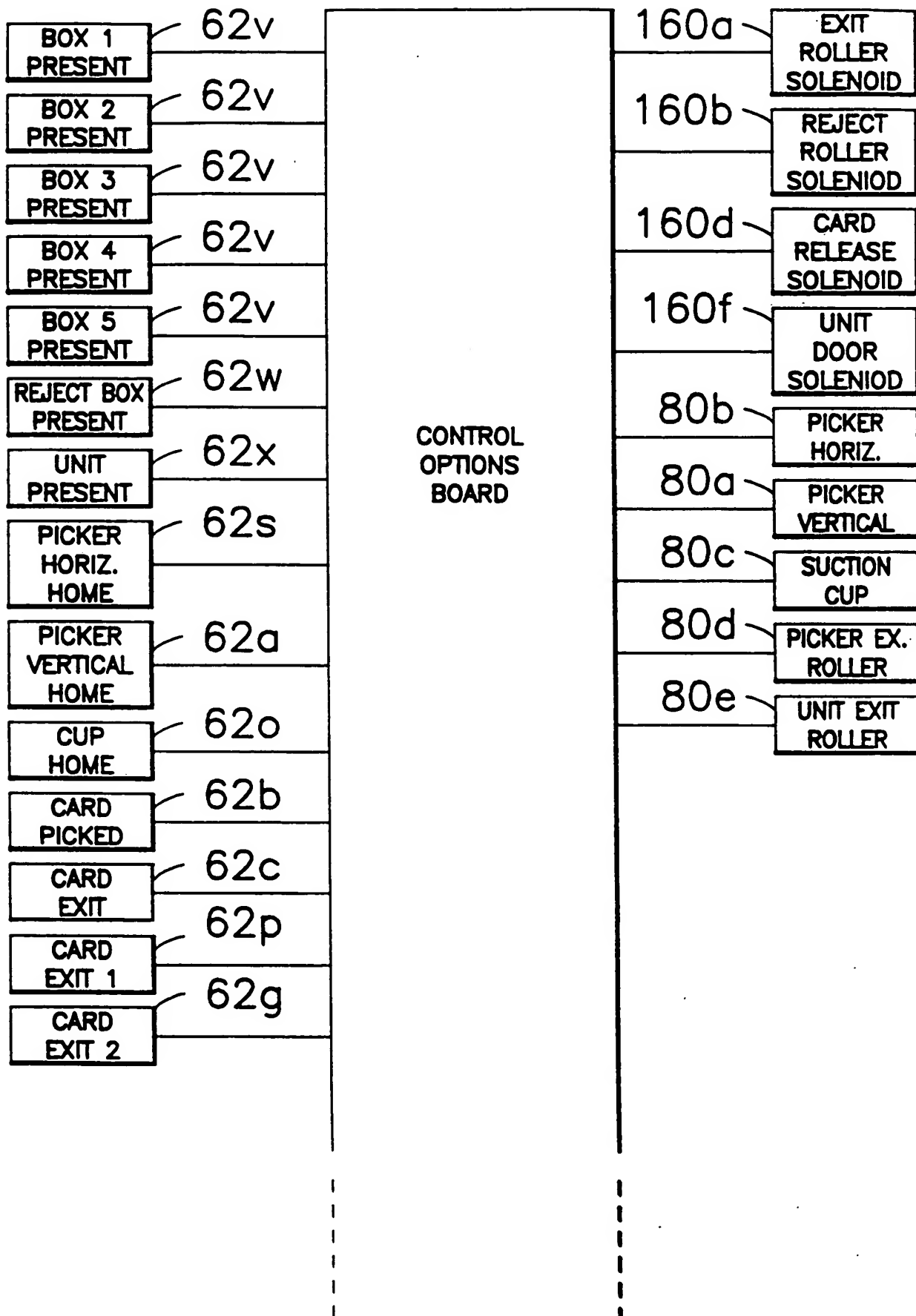
FIG. 17

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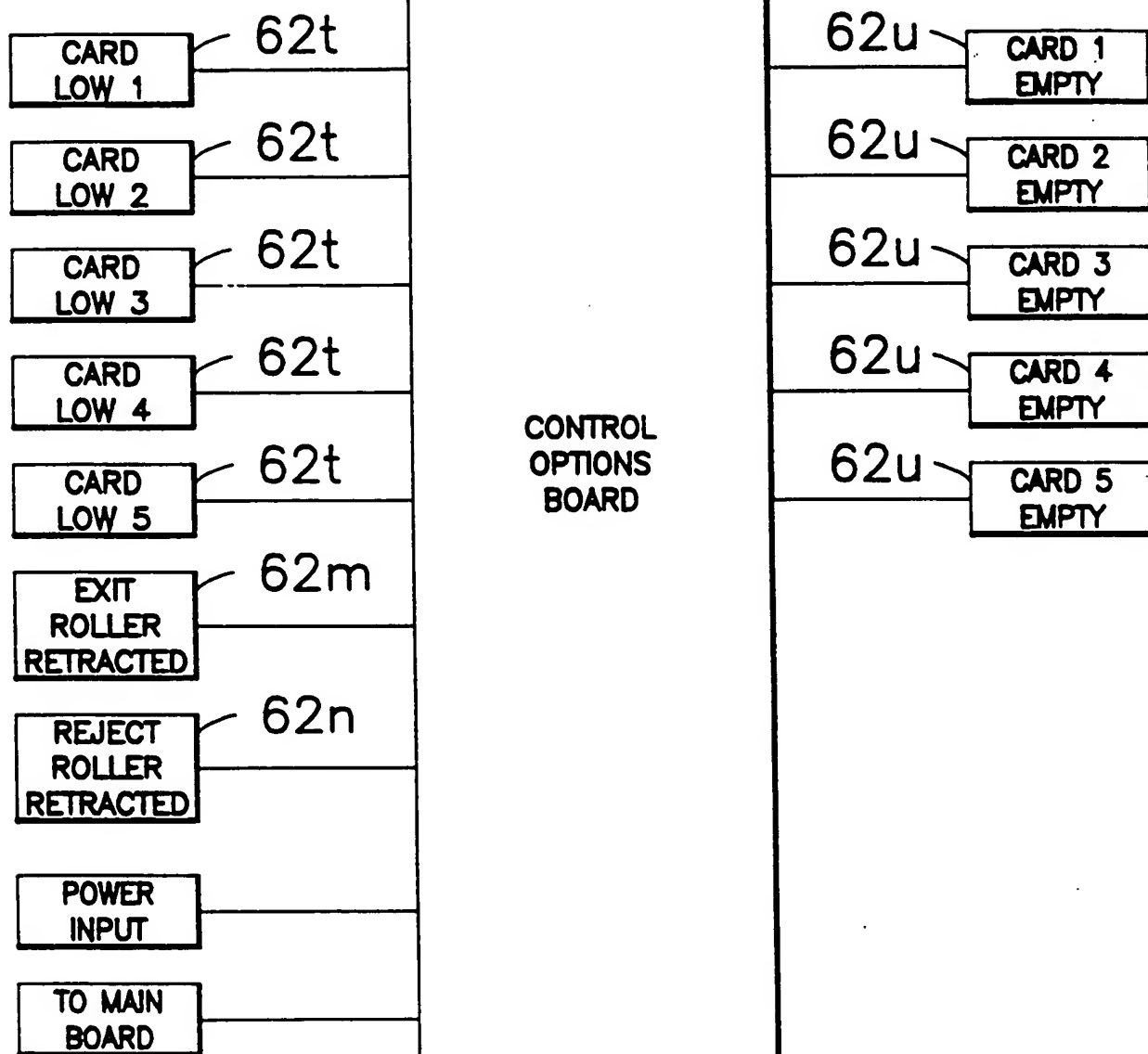
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FIG. 19A



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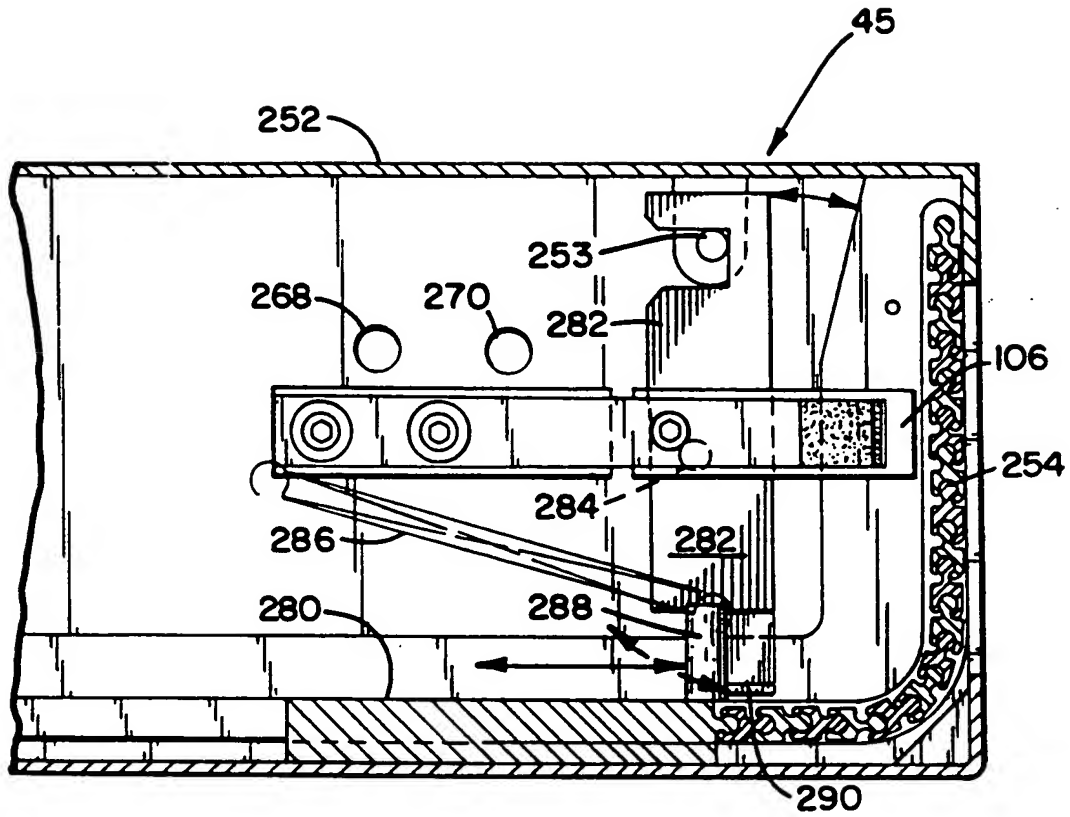
FIG. 19B



**FIG. 20**

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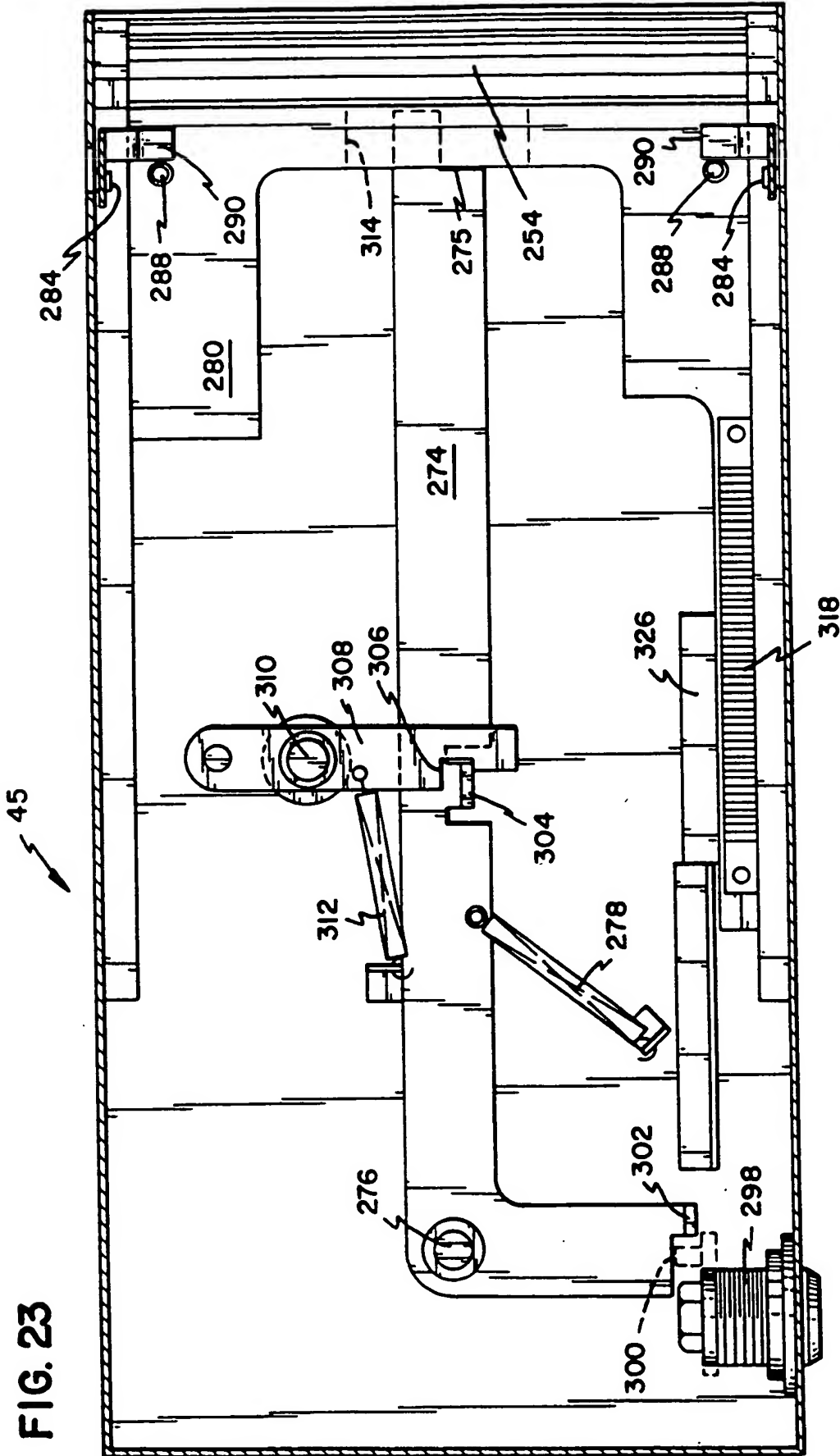
FIG. 21





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FIG. 23



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FIG. 24

